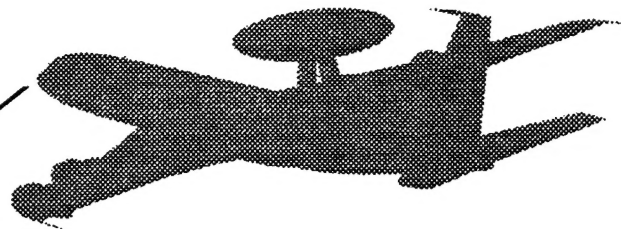
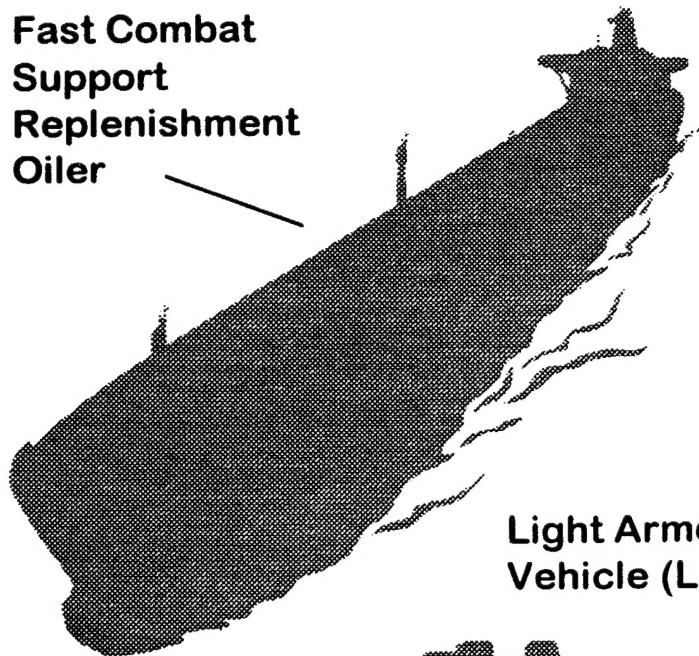




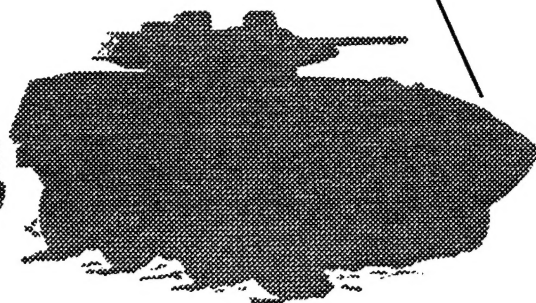
**AWACS**



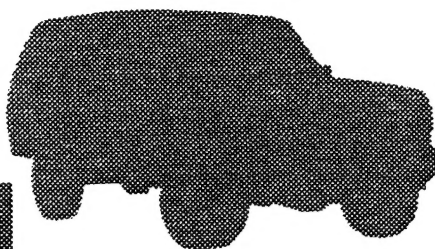
**Fast Combat  
Support  
Replenishment  
Oiler**



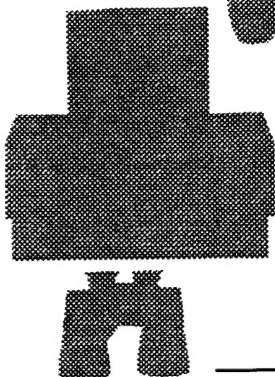
**Light Armored  
Vehicle (LAV)**



**Commercial Utility  
Cargo Vehicle (CUCV)**



**Desktop IV  
Binoculars**



**Beretta  
9mm Pistol**





ACQUISITION AND  
TECHNOLOGY

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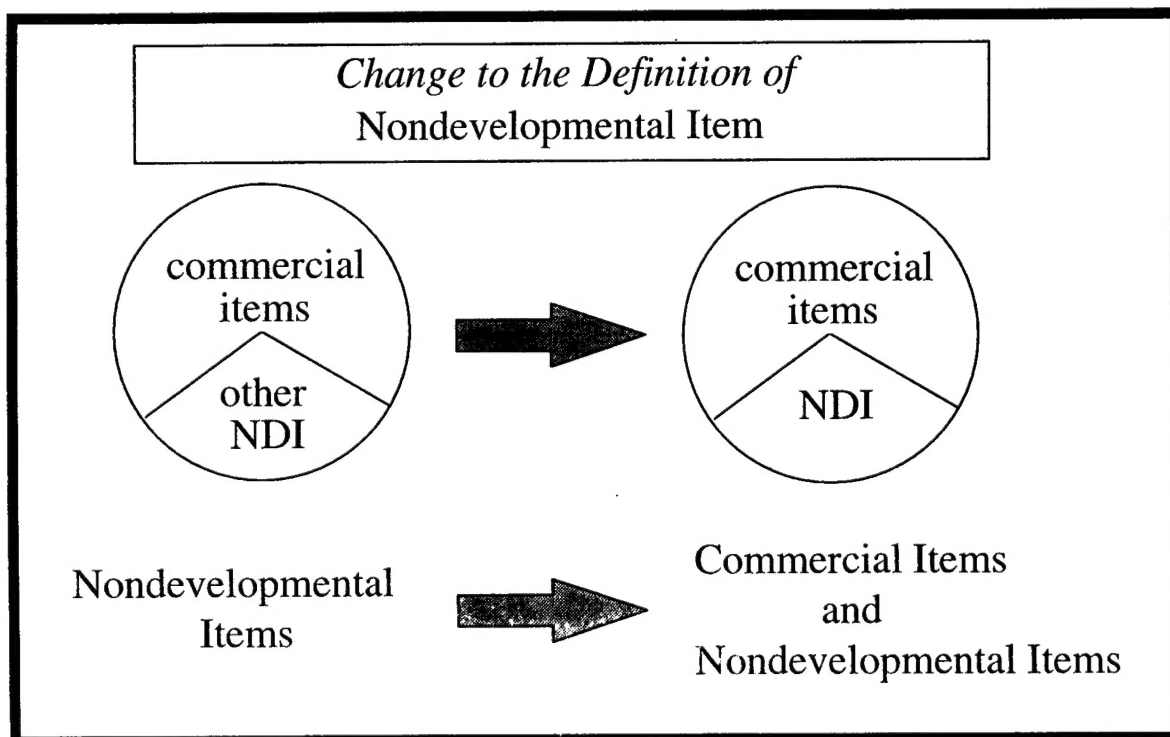
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# FOREWORD

The Department of Defense must learn to use commercial and nondevelopmental items (NDI) effectively. Our ability to field affordable, state-of-the-art systems when they are needed, and to buy the millions of items needed to support our troops and fielded systems, depends on efficient use of available resources. The commercial industrial base is a vast resource capable of providing many of these items.

A significant change in this updated version of the handbook is the definitional separation of commercial items and nondevelopmental items. This separation is for the purpose of clearly indicating the Department's preference for the use of commercial items (including systems) to the extent possible. Originally, and in statute, commercial items were considered a subset of nondevelopmental items, with NDI loosely defined as any previously developed item regardless of the source of the development. However, commercial items are not considered a subset of NDI in this handbook and in the Federal Acquisition Regulation (FAR), but rather a separate set of items. The handbook also reflects changes to the acquisition of commercial items resulting from the Federal Acquisition Streamlining Act of 1994.




This handbook offers guidance on commercial and NDI acquisitions. The information is applicable to all types of materiel: systems, subsystems, assemblies, parts, and items of supply. This guide does not present a “cookbook” approach to commercial and NDI acquisitions—such an approach could not accommodate that vast array of potential applications. It does offer “lessons learned” and “things to consider” to help you shape your overall thought process.

Your recommendations on improving the content of this handbook are welcome. Please send your comments to:

Director, Acquisition Practices  
OUSD (Acquisition & Technology)  
The Pentagon, Rm 3B253  
Washington, DC 20301-3300

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Walter B. Bergmann, II  
Director  
Acquisition Practices



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## ACRONYMS

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ADS	Advanced Display System
ANSI	American National Standards Institute
CBD	Commerce Business Daily
CID	Commercial Item Description
CUCV	Commercial Utility Cargo Vehicle
DoD	Department Of Defense
DoDISS	DoD Index Of Specifications And Standards
FAA	Federal Aviation Administration
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act
FCT	Foreign Comparative Testing
GPS	Global Positioning System
GSA	General Services Administration
IFB	Invitation For Bid
IPS	Integrated Program Summary
LAV	Light Armored Vehicle
MIL-DTL	Defense Detail Specifications
MIL-PRF	Defense Performance Specifications
NDI	Nondevelopmental Item
OFPP	Office of Federal Procurement Policy
ORD	Operational Requirements Document
PH	Probability of Hit
PLGR	Precision Lightweight GPS Receiver
R&D	Research And Development
R&M	Reliability And Maintainability
RFP	Request For Proposal
SLGR	Small Lightweight GPS Receiver
T&E	Test And Evaluation
UL	Underwriters Laboratory

# CHAPTER 1

## GENERAL INFORMATION

### PURPOSE

---

This handbook is a guide for acquisition managers and personnel in other functional areas who are involved in buying commercial and nondevelopmental items (NDI). It is intended to help you buy these items without inhibiting your use of creative and innovative strategies. You should tailor the guidance provided to the circumstances of your particular acquisitions.

We address the entire spectrum of acquisitions from systems to items, so you will also need to use sections of this handbook selectively. For example, the section on market research is generally applicable to all acquisitions while the chapter on logistics support is more relevant to system and repairable item acquisitions than consumable items.

Many acquisition principles are the same for commercial items and NDI because for both types of items:

- the basic design is set.
- design changes are not controlled by the buyer.
- the maximum use of commercial practices is desired.

However, additional considerations apply when buying commercial items. Sections in this handbook that apply specifically to commercial items are so noted.

#### Focus on the Goal

The statutory definition of "commercial item" was developed to trigger the statutory procedures and exemptions for buying commercial items in the Federal Acquisition Streamlining Act (FAR Part 12)—to make it easier for the government to buy them.

The overarching goal is to use commercial items to fill DoD requirements to the greatest extent practical.

## BENEFITS AND CHALLENGES OF USING COMMERCIAL AND NONDEVELOPMENTAL ITEMS

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In defining requirements for new needs, you must give first preference to the use of commercial items and second preference to the use of NDI.

The potential benefits to the Department of Defense from the use of commercial items and NDI to meet requirements have grown in number and significance over the last two decades as the defense environment has changed.

In the early 1980s, the sole incentive for DoD use of commercial items was seen as potential savings in procurement costs—the economies of scale of the much larger commercial market allow items to be sold at lower prices. In today's environment of reduced budgets, cost savings continues to be a strong incentive.

The reasons for using commercial items, however, have grown in number. In 1986, Congress passed legislation requiring the Department of Defense to give preference to the acquisition of nondevelopmental items. The passage of this legislation was a response to the

- increasing cost of developing systems.
- increasing time to field systems.
- technical risk associated with new development.

Use of existing, previously developed items, whether commercial or military, saves research and development costs, shortens fielding time, and reduces the risk associated with new development. Based on these incentives, which are applicable to any previously developed item, Congress broadened the preference for the acquisition of commercial items to preference for the acquisition of nondevelopmental items, coining the term.

In the 1990's, two more compelling reasons for using commercial items specifically were recognized.



First, the Department of Defense must buy from the commercial market to access state-of-the-art technology and products. In many of the technological areas significant for defense items, the defense department no longer leads private industry in research, development, and application. For example, in the fields of communications, electronics, and computers, the pace of technological evolution resulting from high commercial demand outstrips the capabilities of any government research and development (R&D) program.

A second important benefit from the use of commercial items is the integration of the defense and commercial industrial bases. DoD requirements that are integrated into commercial production are far more likely to have a stable and existing industrial base to draw from if there is a surge in requirements due to an emergency. Additionally, in times of reduced procurement, DoD business is not sufficient to keep many defense-unique suppliers in business. Integrated commercial and defense production is beneficial for the nation's security and economy in the long run.

Buying and using commercial and nondevelopmental items also present some challenges and departures from acquisition "business-as-usual." For example, items developed primarily for non-DoD sales may require performance trade-offs to meet DoD needs. Or it may be necessary to modify the item itself, which requires special management to handle the ramifications of the modifications.

Logistics support of commercial and nondevelopmental items can also be a challenge. Logistics support activities normally accomplished in pre-production phases of a development program often have to be accelerated for acquisitions with more immediate delivery. Using contractor logistics support or relying on commercial product support systems are frequently the best solutions. Defense logistics support systems may have to be replaced or at least supplemented by contractor support.

### **The Benefits Of Buying Commercial and Nondevelopmental Items**

- Lower life-cycle cost
- More rapid deployment
- Proven capability
- Increased competition

The goal is to get technology to the users when they need it—at an affordable price

### **Additional Benefits of Commercial Items**

- Broader industrial base
- Access to state-of-the-art technology

## COMMERCIAL BUYING PRACTICES VERSUS GOVERNMENT BUYING PRACTICES

---

Government and commercial buying practices differ in some fundamental ways. Commercial procurement attempts to obtain best value for the company to, in turn, maximize profit. Government procurement is geared, by public law, to:

- maximizing opportunity for sellers through open competition and the protest forum,
- effecting change through socio-economic provisions, and
- spending taxpayer dollars prudently.

The government's goals are more complex than those of commercial sector, but the government can emulate, at least in part, many commercial acquisition practices.

Commercial practices include:

- extensive market research.
- performance product descriptions.
- emphasis on factors—in addition to price—in making award decisions.
- consideration of suppliers' past performance.
- close and long-term relationships with suppliers.
- just-in-time distribution systems.
- electronic transaction processing.
- reliance on warranties and supplier quality assurance.
- supplier retention of technical data rights.

Case Studies in Appendices C and D demonstrate the effectiveness of using commercial products and practices.

This handbook addresses many of these practices. Use of these practices to the extent possible under the Federal Acquisition Streamlining Act (FASA) of 1994 increases the Department of Defense's ability to tap the commercial market.

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## DEFINITIONS

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The Federal Acquisition Regulation (FAR) defines the terms **commercial item** and **nondevelopmental item**. The FAR definitions, further clarification, and illustrative examples follow.

### Commercial Item

**1. FAR:** *Any item, other than real property, that is of a type customarily used for nongovernmental purposes and that -- has been sold, leased, or licensed to the general public, or has been offered for sale, lease, or license to the general public.*

Possible indications that an item is commercial—customarily used by the general public—are a commercial sales history, listing in catalogs or brochures, an established price, distributors, and availability to the general public. However, a new offering, with no sales history is also considered a commercial item, if it is offered for sale to the general public. Examples of commercial items that DoD buys include transport aircraft, computers, medicine, and fuel. The commercial market is global; commercial items are not limited to the domestic commercial market.

**2. FAR:** *Any item that evolved from an item described in paragraph 1, above, through advances in technology or performance that is not yet available in the commercial market, but will be available in the commercial market in time to meet the delivery requirements of the solicitation.*

Commercial items that evolve from advances in technology or performance include product updates, model changes, and product improvements. For example, new versions of software fall into this category.

**3. FAR:** *Any item that, but for modifications of a type customarily available in the commercial market or minor modifications made to meet DoD requirements, would satisfy the criteria in paragraph 1 or 2, above.*

"Minor modifications" do not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process. In determining whether a modification is minor consider the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be guideposts, but are not necessarily conclusive evidence that a modification is minor. Commercial items with standard commercial modifications are items that are similarly customized for commercial customers. For example, car and airplane manufacturers offer a standard set of options and routinely customize products for their commercial customers.

Use these guidelines in making your technical judgment whether an item is still a commercial item.

**4. FAR: Any combination of items meeting the requirements of paragraph 1, 2, or 3, above, or 5, below, that are of a type customarily combined and sold in combination to the general public.**

A commercial item can be the product of integrating commercial subsystems and components into a unique system. For example, a computer system composed of commercial subsystems integrated into a system would be considered a commercial item. A piece of industrial plant equipment that combines commercial components into a unique item based on customer needs is another example.

**5. FAR: Installation services, maintenance services, repair services, training services, and other services if such services are procured for support of an item referred to paragraphs 1, 2, 3, or 4, above, if the sources of such services:**

- ***offers such services to the general public and the Federal Government simultaneously and under similar terms and conditions, and***
- ***offers to use the same work force for providing the Federal Government with such services as the source used for providing such services to the general public.***

Item installation, maintenance, repair, training, and other services related to item support are examples.

**6. FAR:** *Services of a type offered and sold competitively, in substantial quantities, in the commercial market-place based on established catalog or market prices for specific tasks performed and under standard commercial terms and conditions.*

Construction, research and development services, warehousing, garbage collection, and transportation of household goods are examples of services that meet the provisions of the statute.

**7. FAR:** *Any item, combination of items or service referred to in 1 through 6, above, notwithstanding the fact that the item, combination of items, or service is transferred between or among separate divisions, subsidiaries, or affiliates of a contractor.*

For example, a commercial item transferred to a defense contractor from its commercial division or subsidiary for incorporation as a component in a defense system is a commercial item.

**8. FAR:** *A nondevelopmental item, if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local governments.*

Examples are protective vests used by police departments and rescue equipment used by fire and rescue units. Items developed for state and local governments at private expense are considered commercial items.

## Nondevelopmental Item

Nondevelopmental means "not requiring development." The FAR definition of nondevelopmental item, clarification, and examples follow.

**1. FAR:** *Any previously developed item used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign*

**Nondevelopmental item** is a statutory term describing items that have been previously developed for production.

***government with which the U.S. has a mutual defense cooperation agreement.***

NDIs include defense products previously developed by U.S. military services or defense agencies of U.S. allies. For example, the mechanical dereefer used with the Army's cargo parachutes was developed for and first used by the Canadian army. Many trucks developed by the Army are also used by the other military services.

***2. FAR: Any item described in subparagraph 1 above, that requires only minor modification to meet the requirements of the procuring agency.***

### NDI Integration

The goal is to ensure a mature integrated system that returns the benefits of the NDI components, with the risks identified and managed with appropriate development, test, and evaluation.

The Mobile Subscriber Equipment System, originally developed for the French army, was modified by the U.S. Army for use as its field communication system. The Army's M-119 Howitzer was a modified version of the British Light Gun.

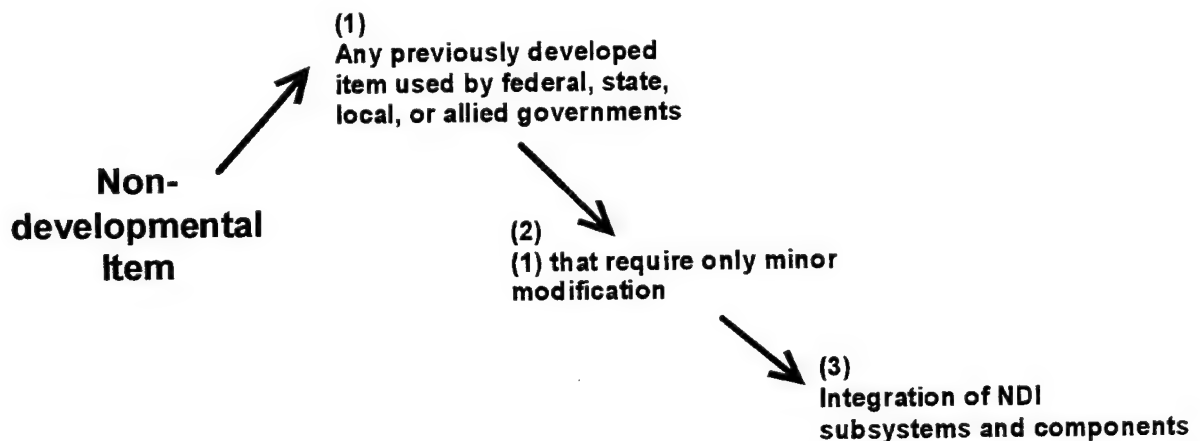
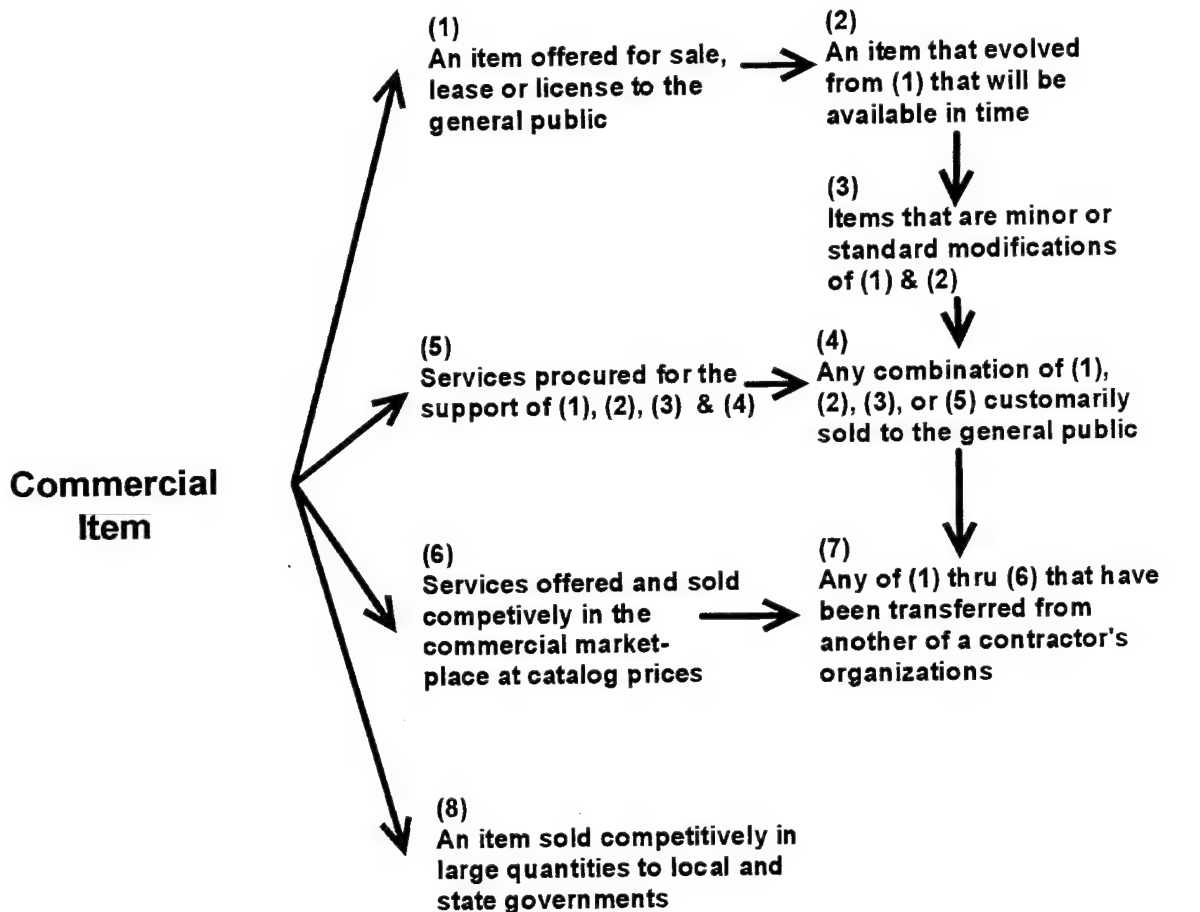
***3. FAR: Any item currently being produced that does not meet the requirement of paragraphs 1 or 2, above, solely because the item is not yet in use.***

Items fully developed and in production, but not yet sold and in use, are considered nondevelopmental. This distinction is made in order to capture the latest product developments and new technology. It is not intended to include prototypes or experimental runs. This type of NDI presents greater risk than items that have a performance history.

The effort required for software development associated with integration is frequently underestimated, causing cost and schedule overruns.

A category of NDI not explicitly addressed in the FAR is integration. Integration is another viable way to use NDI. An item created by integrating non-NDI subsystems and components into a unique system is a nondevelopmental item. In these cases some development may be involved to ensure that NDI components and subsystems function as an assembled item and in the manner intended. The integration process also usually includes the development of software necessary for components and subsystems to work together. Any development required for integration should be managed through a developmental acquisition strategy.

## FAR Definition Summarized



## APPLICATION OF COMMERCIAL AND NDI ACQUISITION

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The use of commercial and nondevelopmental items applies to the entire range of goods and services purchased by the defense department. Acquisitions of major weapon systems, basic consumable items, and everything in between offer opportunities for the use of commercial items and NDI to varying degrees. Consider their application as a matter of degree rather than an all-or-nothing proposition. Although complex defense systems may not be manufactured as end items on commercial lines, their subsystems and components may well be. The following page displays the spectrum of acquisition approaches used by the Department of Defense—ranging from unmodified NDI acquisitions to complete DoD developments.

## THE DEVELOPMENTAL SPECTRUM

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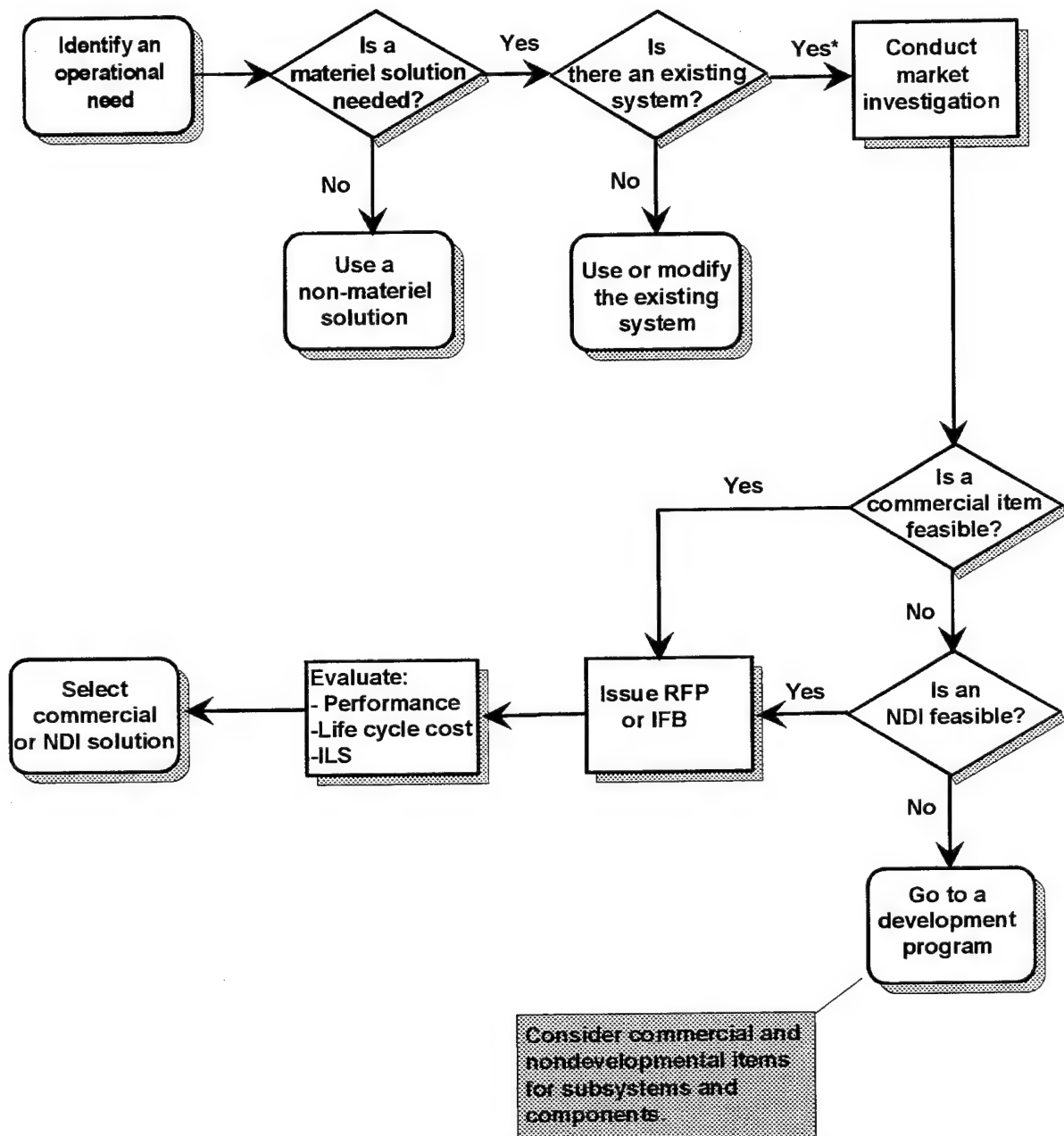
If an item can move from full development to unmodified commercial item or NDI, cost and time are reduced. Opportunities for commercial items and NDI include modifying an existing item (ruggedize, militarize) and incorporating commercial items and NDI into a system. Understanding the type of item you are buying is important. The type of item—commercial, modified, etc.—affects the entire acquisition from the acquisition strategy to the support plan.

The use of commercial items in military systems is no longer a question of "yes or no" but a question of "to what degree."

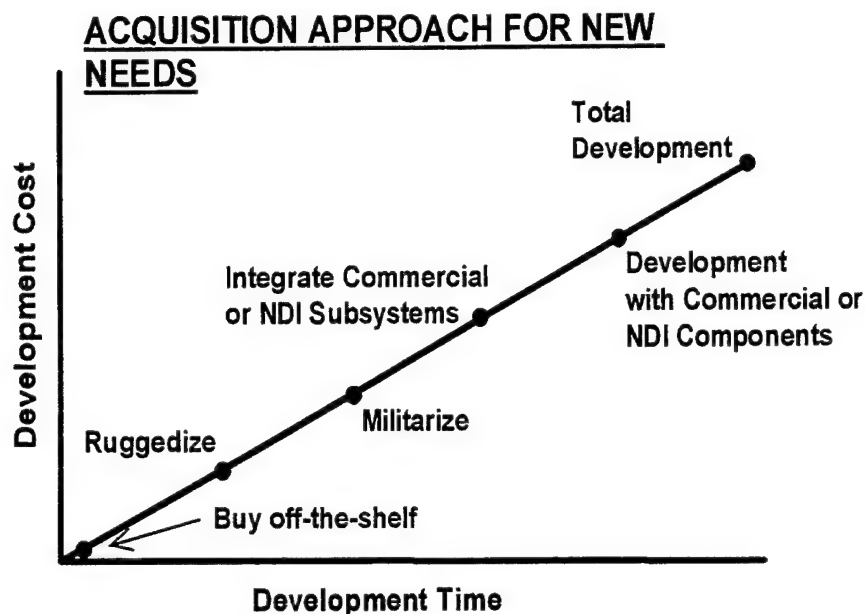
Don't overlook the value of inserting commercial items and NDI at the subsystem and component levels in major development programs. The systems engineering and integration processes should explore commercial and NDI use. Use of commercial items can capture state-of-the-art technology and products available in the commercial market. This approach can provide significant savings in research and development dollars and provide increased technical capabilities. Opportunities to use commercial items, especially at the subsystem and component levels, must be pursued and addressed at each phase of development.



## The Commercial/NDI Decision Process



\* In preparation for the market investigation establish objectives and thresholds for cost, schedule, and performance based on the users' operational and readiness requirements.



## Examples of Acquisition Solutions

The following military systems illustrate the range of approaches available:

Off-the-shelf (unmodified)	Small Lightweight GPS (Global Positioning System) Receiver Water gel heat shield Law enforcement vehicles
Ruggedization	Commercial Utility Cargo Vehicle (CUCV)
Militarization	CUCV Precision Lightweight GPS Receiver
Integration of commercial subsystems	10-ton M.A.N. truck Desktop IV computer
Inclusion of commercial components	Pershing II Missile (e.g., guidance platform from F-15)

# CHAPTER 2

## DEFINING THE REQUIREMENT

### PURPOSE

---

This chapter addresses:

- Developing the operational requirement.
- Conducting market research.
- Identifying potential commercial and NDI alternatives.
- Evaluating commercial and NDI alternatives.
- Selecting and preparing product descriptions.

### THE OPERATIONAL REQUIREMENT

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Operational requirements should be flexible and stated in performance terms to maximize potential commercial and NDI solutions. A distinction should be made between requirements that are mission critical and those that are mission enhancements. Early communication and cooperation with the user is also important—to clarify flexibility in the system requirement and to share knowledge of potential commercial items and NDI that may be available to meet the requirement.

Users must be realistic in stating their needs and considering trade-offs when presented with commercial and NDI alternatives. If the user is aware of the impact on risk, performance, cost, and schedule of the various alternatives, he can make realistic trade-off decisions and ensure the requirement is satisfied.

Identify requirements as objectives and thresholds. An objective is a value beyond the threshold that could potentially have a measurable beneficial impact on capability, operations, or support above that provided by the threshold value. A threshold is the minimum acceptable value for a parameter that, in the user's judgment, is necessary to provide a capability that will

Users must be realistic:

- in stating their needs
- in considering trade-offs

when presented with commercial or NDI alternatives.

satisfy the mission need. Using the cost-performance integrated product team process, cost, schedule, and performance may be traded off with the range between the objective and the threshold ("known as the trade space") without obtaining Milestone Decision Authority approval.

Operational requirement have frequently been considered fixed and unalterable. This rigidity doesn't work in today's defense environment. Requirements must be continuously reviewed as new knowledge of market capabilities and products is received. This receptivity is especially important during the early stages of an acquisition.

## **IDENTIFYING AND EVALUATING COMMERCIAL AND NDI POTENTIAL**

---

Don't assume the defense environment is more demanding than the commercial environment without investigating the various commercial uses.

In determining if use of a commercial or nondevelopmental item is feasible, it is important to assess the total operation and support effectiveness, not just performance. This comprehensive assessment is particularly significant when evaluating commercial products or other items not designed for the defense environment. The acceptability of commercial items for DoD use depends on reliability, performance, logistics supportability, cost, and other factors. However, don't assume the defense environment is more demanding than the commercial environment without investigating the commercial uses of an item. Commercial products developed for industrial or other harsh environment, high reliability applications may meet defense needs even though the general consumer products do not. In addition, consider buying small quantities of commercial items for user evaluation.

## **COMMUNICATING THE REQUIREMENT**

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An important first step in conducting market research is communicating DoD requirements to industry. This information must reach industry early in the process for two reasons. First, it allows vendors to identify potential commercial items or NDI that can meet the

DoD requirement. Second, early communication of requirements ensures that industry representatives will be better prepared to answer questions asked during subsequent market research and analysis.

DoD requirements can be communicated to industry through "sources sought" announcements, requests for information, and bidders conferences. Be sure that requirements are stated in performance rather than design or "how-to" terms.

Detailed examples of the kind of information you can request on system interface or integration requirements, communications computer system interface requirements, maintainability requirements, and logistics support are contained in Appendix B.

Have the various functional discipline proponents and independent testers, as well as the technical experts, provide questions to be answered during the market investigation process. Specific questions peculiar to the item to be procured (performance, operation, and design features) need to be asked as they must be addressed in the test and evaluation plan.

### **MODIFYING THE NEW TRAINING HELICOPTER REQUIREMENT**

Distinguishing between critical and non-critical requirements and relaxing non-critical requirements simplified an Army aircraft procurement. After its analysis of comments received from competitors, the Army reduced several requirements including:

- Airspeed from 100 to 90 knots
- Hover capacity from 4,000 feet density to 2,300 feet density
- Fuel capacity from 3-1/2 hours to 2-1/2 hours
- Airframe crash-worthy limits from 26-feet-per-second to a limit open to discussion based on contractor data

The reductions allowed more contractors to compete with proven, existing helicopters. In fact, one contractor avoided elimination when the airspeed requirement was lowered from 100 to 90 knots.

## TRADE-OFF AND MODIFICATION ANALYSIS

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Don't give up on a commercial alternative prematurely.

Consider all potential alternatives and solutions. Acquisitions frequently require trade-offs between performance and cost, and between one performance parameter and another. Trade-offs are appropriate when they optimize satisfaction of user requirements—such as performance, affordability, and availability.

Trade-off analysis is an important tool in acquiring an item that presents the overall best value. Immediate or accelerated availability, coupled with reduced risk and saving the cost of development, may be much more important to the user than the marginal increase in performance possible from a full development program.

For example, a commercial alternative may not satisfy a particular reliability requirement (e.g., 300 hours mean time between failures). However, it's possible the requirement could actually be met—demonstrated with additional process control and stress testing—or a decision could be reached during the trade-off analysis to accept a lesser reliability requirement. The trade-off analysis might demonstrate that the reliability shortfall could be compensated for by other equipment capabilities or performance. Or, if there were sufficient cost savings per unit, redundancy or a dispose-and-replace policy might compensate for the shortfall. You should address reliability as part of the total system reliability or mission requirement.

Use similar analysis to evaluate producers' processes, production methods, and production control procedures. It is usually better to accept or tailor these rather than to impose totally new procedures that will drive up risk and cost.

When performance trade-offs are not possible, determine the feasibility of modifying or augmenting the item to meet DoD requirements fully. Modifying the item to meet the user requirement more completely may be a viable approach.

However, modification of a commercial or non-developmental item results in a partial development effort and must be handled accordingly. Many of the cost, risk, schedule, and supportability benefits may be jeopardized as a result of modification, and it's important to reevaluate the use of a nondevelopmental or commercial item in light of the specific planned modifications. The test and logistics support plans must take the scope of the modification into account to ensure the success of the effort.

Evaluate the total effect of modifications, particularly in the area of logistics support. For example, a vendor may not recognize or support the resulting redesigned item and the Department of Defense may have little or no organic support capability for it.

If you determine that a commercial or NDI solution is not available or acceptable at the system level, you should still encourage maximum use of commercial and nondevelopmental items below the system level as subsystems and components, giving first preference to commercial items.

You can factor effectiveness in locating, selecting, and using commercial or nondevelopmental items into the source selection evaluation criteria to give prime contractors an incentive to consider these items. Your objective is to minimize life-cycle costs by avoiding unnecessary developmental costs for equipment that is available or could be suitable after modification.

Although maximum use of commercial and NDI components and subsystems is encouraged, the government developer should evaluate the risks of assuming the responsibility for integrating commercial and NDI components and subsystems into a complex system. Responsibility for integration in complex systems should be left to a single contractor. The government developer should evaluate the impact of hardware and software integration of the commercial items and NDI on system performance and mission utility and on system reliability, availability, maintainability, and logistic supportability.

### **Market Research Shapes the Requirement**

The draft letter requirement for the Army's M-24 Sniper Rifle required a probability of hit (PH) at 800 meters of .95.

The market research indicated the required probability of hit might be too high to attain. After evaluating the market investigation data, the acquisition team recommended that the requirement be relaxed. It was reworded to indicate a required PH of between 0.85 and 0.95 at the 800 meter range. The team's logic was that 0.95 was the original requirement and a PH of 0.85 was at least comparable to the PH of the existing USMC M-40A1 sniper rifle.

The team also recommended reducing the service life of the rifle from 15,000 to 10,000 rounds based on their market research.

## MODIFICATIONS HAVE RAMIFICATIONS

A modification of a commercial or nondevelopmental item may:

- ✓ Necessitate special management for repair parts.
- ✓ Change personnel requirements for support or operation.
- ✓ Alter safety or health characteristics.
- ✓ Change the performance envelope.
- ✓ Change the form of the item.
- ✓ Disrupt the commercial production process.

## MARKET RESEARCH

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"Market Analysis for Commercial and Nondevelopmental Items," SD-5, contains detailed information on market research.

Market research provides information on technologies, existing products, varying levels of product performance and quality, commercial practices, support capabilities, and industrial capabilities. This information is used to determine the feasibility of using a commercial or nondevelopmental item to satisfy a need. Market research is required before the development of requirement documents (see FAR Part 10 and DoD 5000.2-R). The market research effort includes two separate but related activities: market surveillance and market investigation.

### Market Surveillance

Market surveillance is the continuing effort by acquisition and development activities (including laboratories) to remain abreast of advances, changes, and trends within their commodity areas. These activities must monitor marketplace activities, as well as technologies and products with potential for DoD



use. Market surveillance provides a knowledge base for determining whether technology and products may be available to meet military needs as expressed in operational requirements. You should use this knowledge of the market to develop and modify operational requirements—creating greater opportunity for NDI acquisitions.

Market surveillance provides a broad knowledge of the potential for the use of commercial and nondevelopmental items to fill a DoD requirement. However, more specific, detailed information from the marketplace must generally be obtained before a final decision can be made, not only from an operational performance perspective, but also considering reliability, supportability, cost-effectiveness, safety, manpower, and personnel.

This focused, more specific market research, the market investigation, responds to a specific requirement.

### **PRIMARY SOURCES FOR MARKET SURVEILLANCE INFORMATION AND DATA**

- Industry publications, catalogs, and product data sheets.
  - Independent research and development reports and presentations.
  - Participation in professional societies and related activities.
  - Counterparts in other military services.  
(See DoD Pamphlet SD-1, "Standardization Directory.")
  - Trade shows and industry workshops.
  - Discussions with industry representatives.
  - Foreign military data exchange.
  - Journals.

## Market Investigation

### **Who organizes and manages market research?**

Market research leading to the development of a requirement document or product description is organized and managed by the technical personnel responsible for documenting the requirement for acquisition. The technical specialist is also responsible for documenting the results of the research and the analysis of the data.

The market investigation is the central activity in evaluating the availability of commercial and non-developmental items before an initial milestone review decision or before drafting a product description, such as a commercial item description. The market investigation provides the basis for finalizing the operational requirement, developing a product description, determining logistics support requirements, and determining what additional testing is required.

The market investigation also provides the basis for determining whether to use the policies and procedures for acquiring commercial items given in Part 12 of the Federal Acquisition Regulations (FAR).

Conduct the market investigation early in the acquisition process to take advantage of the greater flexibility of the requirement early on. If you plan to prepare a standardization document, such as a commercial item description, conduct the market investigation before you finalize the technical characteristics of the item and write the first draft of the standardization document. If the responsible engineering activity and the activity preparing the standardization document are not the same, the market investigation should be a coordinated effort between the two activities.

Make the market investigation a team effort. Include on the team, as applicable, representatives from engineering, logistics, testing (developmental and operational), and contracting, and include the user. You should document the scope and results of the market investigation in the Integrated Program Summary (IPS), which describes the consideration of commercial and other NDI alternatives, at Milestones I and II. For acquisitions that do not require this summary, document the market investigation results in the product description file. Contractors who design and develop systems and products for the Department of Defense should also conduct market investigations to identify and

evaluate commercial and NDI alternatives throughout the development process.

Market investigations vary from informal telephone inquiries to comprehensive industry-wide reviews. Use existing data, like historical user experiences and previous test reports, as much as possible.

The first step in a market investigation after an operational requirement has been identified is to review the information from market surveillance to determine the potential of using available products and to identify the pool of potential suppliers. Based on this preliminary review, you can determine if you have sufficient information to decide to use a commercial item or (if a commercial item is not available) a non-developmental item, or if you need additional information.

Additional data is then collected (or generated) and evaluated to support a final decision and to get the information needed to carry out the acquisition.

One possible approach is to include a brief narrative description of the requirement in the announcement of the impending acquisition and invite interested vendors to respond. Once prospective suppliers are identified, you can then provide respondents with draft performance specifications and a detailed questionnaire designed specifically to determine their product's ability to meet requirements. Information on item characteristics should be evaluated to determine if trade-offs should be considered or if requirements should be otherwise adjusted. This phase may also include the acquisition of data through testing.

Limit testing during market investigation to testing essential to obtain sufficient data to make a decision.

This testing may be done as part of the market investigation or, as an alternative to actual testing, you may:

- Obtain and review manufacturer test results.

### **Who participates in the market investigation?**

The team should include representatives of the groups who will significantly influence the program as it progresses.

These might be:

- potential vendors
- users
- operational and development testers
- logistics specialists
- life-cycle cost analysts
- program managers and engineers

- Observe manufacturer's testing at his facilities.
- Obtain usage and failure data from other customers or other DoD users.
- Obtain test results from independent test organizations, such as Underwriters Laboratory.

If, after the initial data collection, more information is needed to make a sound decision, you can purchase or lease commercial or NDI candidates for operational testing. These test results are not used to select a specific contractor or producer; the purpose of the testing is to provide inputs to the decision process. The test results will:

- Directly support the decision to accept or reject the use of a commercial item or NDI.
- Influence preparation or refinement of the operational requirement document.
- Influence the preparation of solicitation documents.

Additional test and evaluation, if required after the market investigation, is described and justified in the test and evaluation plan.

## A Market Investigation Matrix

The overall results of a market investigation can be summarized and made clearer with a matrix that presents the results graphically.

The following matrix, which summarizes the results of a market investigation for a global positioning system receiver, is provided as an example. Significant item characteristics are listed in the first column on the left. Companies that responded to the market survey are listed across the top. (A detailed discussion of a related procurement is contained in Appendix C.)

## GPS Market Survey

Legend: ✓ = Meets Requirement

X = Does not meet requirement

? = Information not provided

Candidate	Marconi	Interstate	Magnavox #1	Magnavox #2	Motorola	Collins #1	Collins #2	Stanford	Texas Instr.	Tracor	Trimble Navpak	Remarks
Features												
Battery Power	✓	✓	✓	✓	Add-on	✓	✓	✓	✓	✓	✓	
Waypoints	X	✓	✓	✓	X	✓	X	✓	✓	✓	✓	
MGRS	X	✓	✓	✓	✓	✓	X	X	✓	X	✓	
Lat/Long	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
UTM	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	
SEP <100m	30	51	100	17	25	16	25	14	16	100	43	accuracy
<10 lbs.	5	10	9.5	29	7	17.5	9.9	7.5	9.8	7.7	5	weight
User Friendly	X	X	✓	✓	✓	X	✓	✓	✓	✓	✓	field test
Self Training	X	X	✓	✓	✓	X	✓	✓	✓	✓	✓	field test
25 m/sec	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
5 m/sec <sup>2</sup>	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Built-in Display	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	
Malfun. Ind.	?	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	
160° Conical	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cost	?	9.5K	4.9K	7.8K	10.0K	24.5K	14.0K	20.0K	15.0K	9.7K	4.7K	

## SELECTING AND PREPARING PRODUCT DESCRIPTIONS

A product description for an acquisition should express the requirement in terms of specific function or performance characteristics and allow maximum flexibility for suppliers to use established products and practices to meet the requirement. Product descriptions for commercial and nondevelopmental items should evolve from the user's requirement and from information on item and industry capabilities identified during the market research.

Statements of work, product descriptions, and standards present DoD technical requirements in a solicitation. The statement of work describes services required from the contractor to support DoD programs. Product descriptions describe the essential characteristics of material purchases. Standards describe processes and practices—not items.

## The Statement of Work

### **What is a SOO?**

A SOO or statement of objectives is an alternative to a government prepared statement of work. The SOO provides the government's overall objectives and what the government expects the contractor to provide in response to a solicitation. Offerors use the SOO as a basis for the proposed statement of work.

The statement of work is the document in which nonmaterial requirements are defined either directly, or indirectly through cited documents. Examples of services that would be included in a statement of work are training, testing, maintenance, and repair services. The statement of work should establish tasks and identify work to be performed.

Avoid citing DoD-unique product descriptions and standards when developing statements of work for commercial services. Take advantage of standards set by private sector standards-setting bodies and regulatory agencies, such as the Federal Aviation Administration (FAA) and Underwriters Laboratory (UL), and rely on the use of commercial practices to the extent possible. When DoD-unique product descriptions and standards are referenced, tailor them to the specific procurement; do not apply them unilaterally.

## Product Descriptions

The solicitation or contract product description provides the essential technical characteristics for the item being purchased and defines the methods or procedures that will be used to verify the technical characteristics. There are several types of product descriptions to choose from:

- Nongovernment standards.
- Commercial item descriptions.
- DoD performance specifications.

- DoD detail specifications.
- Program peculiar specifications.
- Purchase descriptions.

**Nongovernment standards** are developed by private sector organizations, which plan, develop, establish, or coordinate standards, product descriptions, handbooks, or related documents. They can describe items or processes (such as test methods). Nongovernment standards may have been adopted by the Department of Defense and listed in the DoD Index of Specifications and Standards (DoDISS). However, you can use any suitable nongovernment standard, whether or not it's been adopted. Because nongovernment standards are developed by consensus involving all interested parties, they normally document commercial practices or standards for an item or process and are valuable tools in developing product descriptions for commercial items.

**Commercial item descriptions (CIDs)** are simplified product descriptions that describe the available, acceptable commercial items that meet DoD needs. CIDs are normally used to buy commercial items when development of a standardization document is justified. The user's requirement, market research, and coordination with industry form the basis for the development of a CID. You can include requirements for samples or market acceptance in a CID—both are useful tools in simplifying the document. More specific guidance on the development of CIDs and market acceptance criteria is contained in Appendix A. Although market acceptance is used primarily in CIDs, you can use market acceptance criteria in other types of product descriptions as well.

**Defense performance specifications (MIL-PRF) and defense detail specifications (MIL-DTL)** are reserved for military-unique items when development of a standardization document is justified. These types of product descriptions may be used in an NDI acquisition—for example when one military service uses an item previously developed for another service.

### **Online Support**

American National Standards Institute (ANSI) provides a catalog of ANSI approved nongovernment standards on the Internet.

### **What is market acceptance?**

Market acceptance means that an item has been accepted in the market as evidenced by annual sales, length of time available for sale, and after-sale support capability.

See Appendix A for details on using market acceptance.

**Program-peculiar documents** are product descriptions that describe items developed and produced for use under a specific program, or as part of a single system, that have no application outside that program or system. They are frequently used to buy systems. They are not standardization documents. Even when they are used for development programs, program-peculiar documents should encourage the use of commercial and other nondevelopmental items as subsystems, components, and support equipment.

You can facilitate this process by asking the developer to conduct market research to identify commercial item and NDI opportunities and maximize their use in the system. Additionally, to facilitate commercial item and NDI use you must avoid design-type requirements as much as possible.

**Purchase descriptions** are product descriptions which are not standardization documents. Purchase descriptions are used to competitively solicit and contract for an item when development of a standardization document is not justified, such as for infrequent or one-time buys. A "brand name or equal" description is an example of a purchase description. As with other product descriptions, you should use performance terms in writing purchase descriptions whenever possible.

**When is the development of a standardization document justified?**

DoD 4120.3-M, "Defense Standardization Program Policies and Procedures" addresses the criteria.

See Chapter 4, Section B, "Standardization Planning."



## Tips for Selecting and Developing Product Descriptions

- ✓ **Communicate with the user.** Continuous two-way communication between the user and the person preparing the product description is essential—to ensure that the description accurately reflects the user's requirement and to communicate information gained during market research.
- ✓ **Maintain consistency between the product description and the evaluation criteria.** The product description must be consistent with the evaluation process and vice versa—to attain the overall best value for the Department of Defense.
- ✓ **Consider the intended environment.** If the intended environment is similar to that for which the item was designed, you should be able to use existing commercial standards. If a commercial item will be used in a more severe environment, you will need to include those special characteristics.
- ✓ **Evaluate market standards and practices.** For existing items, the market will have established standards for quality, production, and materials, as well as for item support, technical data, and warranties. Deviating from prevailing market standards and practices can erode the benefits of using commercial items.
- ✓ **Establish flexibility in the operational requirement to allow consideration of a broader range of alternatives.** The product description should reflect the user's flexibility by stating requirements in terms of acceptable ranges, targets, or desired and/or required values rather than exact values.
- ✓ **Document result of market research.** Market research information should indicate the potential for use of commercial items and the basis for many of the characteristics contained in the product description.

## Performance-Oriented Requirements

To the extent practical, write product descriptions in terms of function and performance. Functional characteristics address what is to be accomplished; for example, "provide transportation." Performance characteristics address the level at which the function is carried out; for example, "provide transportation at speeds up to 60 miles per hour." A design characteristic, on the other hand, tells how the functional requirement will be met; for example, "provide a four wheel vehicle."

"The Performance Specification Guide," SD-15, contains guidance on writing performance requirements.

Scrutinize all product descriptions before you issue or use them. Identify any design characteristics that could be expressed in functional or performance terms to meet the requirement and, whenever practical, restate them. Product descriptions expressed in performance terms allow greater flexibility in meeting requirements and increase the potential for use of commercial or nondevelopmental items. Furthermore, functional and performance requirements have a long life because they allow continuous insertion of new technology to meet the requirement.

Compare the following two approaches to a product description for a fire extinguisher:

"Each fire extinguisher shall be equipped with a metal clip or bracket to hold the discharge horn when not in use."

"Each fire extinguisher shall be of such design that the horn will be rigidly and securely held, yet be readily removed without damage."

Unless there is an operational requirement that the horn bracket be made of metal, the second statement is preferable. It allows manufacturers to offer a best-commercial-practice horn bracket regardless of the materiel used. The latter statement is more likely to result in a commercial horn bracket being offered.

Rewriting such seemingly innocuous characteristics will allow more commercial products to be offered.

## Application and Tailoring

“Application” is the process of reviewing and selecting product descriptions and standards that have specific application to an acquisition and contractually invoking these wholly, or in part, at the appropriate point in the acquisition cycle. “Tailoring” is the process by which sections of a product description or standard are selectively invoked after a determination that they add value to the specific acquisition has been made. You may also modify the sections invoked to meet the needs of the specific acquisition.

Effective application and tailoring are particularly important for commercial item acquisitions. When documents are not tailored, companies may not offer an item that meets the basic requirement because it does not have other specified characteristics—which have been unintentionally imposed and which may be unnecessary. Tailoring also makes it much easier for potential suppliers to understand the requirement and evaluate their existing products against it—especially suppliers who don’t routinely do business with the Department of Defense. You should also review and selectively apply all contract data requirements.

## Industry Input and Participation

Industry input on product descriptions and statements of work helps clarify technical aspects and helps reveal alternative ways to meet requirements. Here are some avenues for obtaining industry input:

- Sources sought and requests for information advertised in the *Commerce Business Daily*, trade journals, and other mass media.
- Draft solicitations issued before the formal solicitation.
- Electronic commerce information.
- Presolicitation conferences before finalizing product descriptions and solicitations.
- Coordination of draft product descriptions and statements of work with industry.

Develop an industry mailing list. You can get bidder mailing lists and lists of historical suppliers for the same or similar products from the procurement activity. Also make use of on-line lists of vendors, industry associations, and trade listings to ensure that commercial suppliers not historically supplying the Department of Defense are included. Draw attention to the fact that you are looking for commercial alternatives to encourage participation from companies that may not normally consider DoD or any government business.

## **ADDITIONAL REFERENCES**

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"The Performance Specification Guide," SD-15, June 29, 1995). Available from the DoD Single Stock Point, (215) 697-2667 or 2179. If you already have a customer number, please use Telespecs (215) 697-1187 through 1198.

"Defense Standardization Program (DSP) Policies and Procedures," DoD 4120.3-M; July 1993. Available at (703) 681-9340.

The Standardization Program Homepage at the following address:

<http://www.acq.osd.mil/es/std>

"Market Analysis for Nondevelopmental Items," SD-5, February 1992. Available from the DoD Single Stock Point, (215) 697-2667 or 2179. If you already have a customer number, please use Telespecs (215) 697-1187 through 1198.

Federal Acquisition Regulation (FAR), Part 10, Market Research, October 1, 1995 or latest edition.

"Comparison of Army's Commercial Helicopter Buy and Private Sector Buys," United States General Accounting Office Report to the Secretary of Defense, GAO/NSIAD-95-54, March 1995.

# CHAPTER 3

## ACQUISITION PLANNING AND STRATEGY

### THE ACQUISITION PROCESS

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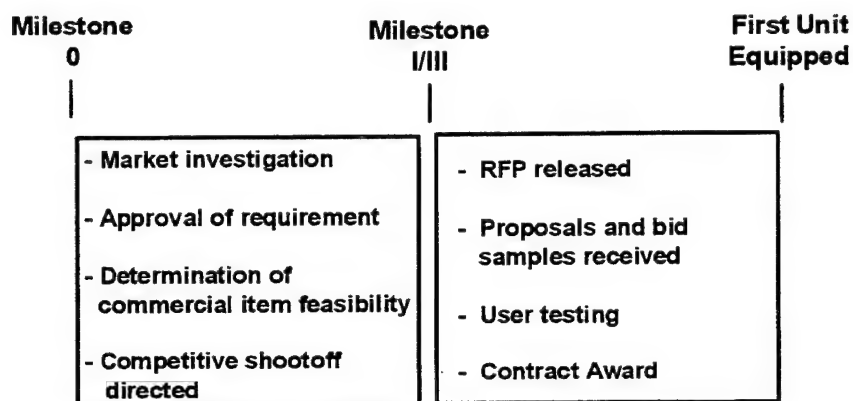
The DoD acquisition process as defined in DoD 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Program (MDAP) and Major Automated Information System Acquisition Programs (MAISAP)*, provides the flexibility needed to execute a wide variety of acquisition strategies. The instruction specifically states that “the number of phases and decision points must be tailored to meet the specific needs of individual programs,” and it identifies the core activities in the acquisition program stating that “tailoring shall focus on how these activities are conducted, the formality of reviews and documentation and the need for other supporting activities.” There is not only latitude, but specific direction, to tailor the acquisition process to fit the acquisition.

In the past, the traditional developmental process consisted of four milestones and three phases with full supporting documentation. DoD 5000.2-R presents a spectrum of processes, ranging from the minimum—appropriate for an unmodified commercial item relying on commercial support, to the maximum necessary for a high risk, full development program.

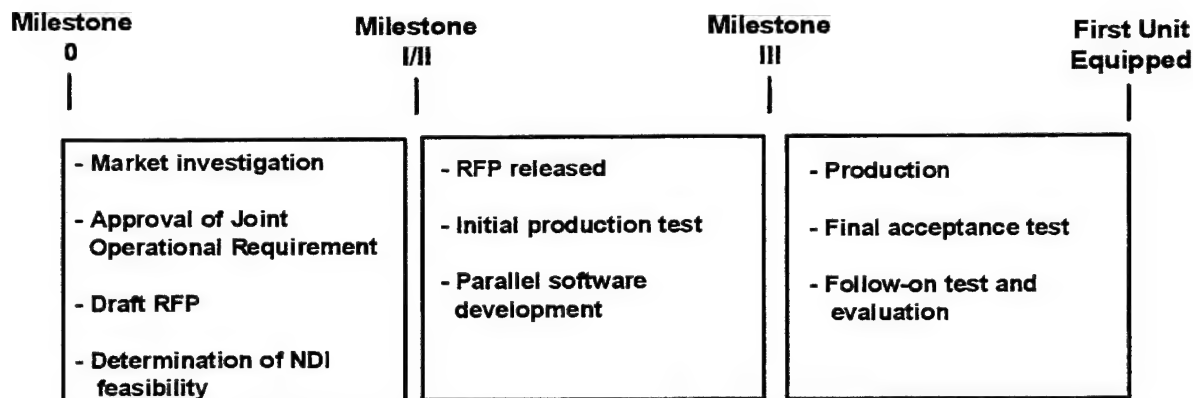
The goal of the acquisition process is to ensure, through demonstration (testing) and documentation (historical or developed data), that the material solution proposed will meet the operational requirement in the operational environment and will be supportable. The acquisition process must demonstrate to the decision authority that these concerns are satisfied.

## Tailored Acquisitions

### M-24 Sniper Rifle:



### Mobile Subscriber Equipment



For acquisitions of commercial items and NDI many of the steps, procedures, requirements, and safeguards associated with the acquisition process may be unnecessary or even counterproductive. These standard process elements should be scrutinized to determine their applicability to the acquisition of a commercial or nondevelopmental item. Many standard process elements may have been accomplished already. For example, documented market investigation results or contractor test and performance data may be

adequate to assess manpower and training requirements, supply support, reliability, transportability, and other support requirements.

DoD 5000.2-R and FAR Part 12 encourage considerable tailoring of the acquisition process for commercial items and NDI. Without tailoring, the potential time and money savings may be lost. Tailoring should reflect the environment in which the item will be used, the extent of modification necessary, and the amount of testing necessary to evaluate the item and to make sound program and business decisions. Examples of such tailoring follow.

**A commercial item meeting the operational requirement with no modification may allow a single decision review (Milestone I/III) to verify the item's suitability and to initiate production.**

**A nondevelopmental item requiring modification may entail an abbreviated engineering development phase to verify suitability of modifications before engineering and manufacturing development of the modifications. Thus Milestones I and II could be combined with subsequent Milestone III production decision upon completion of the verification testing of the modification.**

**A commercial item being integrated into an existing system may also employ a combined Milestone I/II decision when the integration engineering required is considered to be low risk.**

**An NDI that is a unique integration of existing subsystems and components can use an abbreviated engineering and manufacturing development phase to verify the continuity of the operation of the final product—how well the parts function as a whole. This type of NDI normally requires software development, which would also take place in this phase.**

Keep in mind that a decision to eliminate phases and constrict schedules affects logistics support planning and development—making early support planning very important.

## THE PROGRAM OBJECTIVE MEMORANDUM (POM) AND BUDGET PROCESS

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The POM and budget process for commercial and NDI acquisitions is the same as for any other materiel acquisition. However, some special circumstances of these acquisitions may require more cautious management of the process. For example, because an NDI acquisition is faster than development of an equivalent materiel item, there is less time to program funds.

The Federal Acquisition Streamlining Act authorizes government payment in advance of work under such terms and conditions as are appropriate or customary in the commercial market for commercial items.

The problem of less time to program funds is addressed through reprogramming actions or out-of-cycle new start program justifications. The question of the amount and type of funds needed is more problematic. Research, development, test and evaluation funds are normally used for market investigation and purchase of items needed for test and evaluation. They are also used for modification of existing items. Procurement, operations, and maintenance funds are normally used for production and deployment. However, procurement funds can be used for nonrecurring engineering, like that involved in the integration of commercial or nondevelopmental items into a system.

You need to answer the following questions.

- *Is a commercial item solution feasible?*
- *If not, is an NDI solution feasible?*
- *What testing is necessary to determine if a commercial or nondevelopmental item solution is feasible?*
- *If a commercial or NDI solution is feasible, what testing is necessary to determine which of the potential items meet the operational requirement?*
- *Will the government have to buy items to test?*
- *What are the unit costs of the potential NDI solutions?*
- *Is any parallel development required, such as software development or product improvements?*
- *What is the program schedule? When will testing be done? When is contract award expected?*
- *Will one or two contracts be used -- for testing and to procure production quantities?*



## BEST VALUE SOURCE SELECTION

Best value contracting is especially powerful in a commercial item acquisition because you are typically dealing with an existing item that has a quality history, and a supplier who has a support record associated with that item.

A best value source selection evaluates and compares factors in addition to cost or price in making the contract award decision. As private consumers, we often take this approach. We are willing to pay more for a product that has features that we feel give us more value for our money. This concept is not new to government acquisition either, but the more traditional approach has been to acquire products manufactured to detailed government design specifications and to select the lowest cost product. Integrated product teams or other similar program management strategies can help in the selection of an alternative which optimizes performance and life cycle cost factors.

On the other hand, the best value approach is typical of commercial acquisition and, as a result, commercial vendors develop products that include many different features intended to differentiate the product from competitors' products. This practice complicates commercial item source selection. Buying a commercial item may require evaluation of many variations of a product and deciding between them. A thoughtfully structured best value approach is frequently the best solution to the problem.

Begin this approach with a complete understanding of the requirement and the relative importance of its discriminating characteristics.

You must then translate this understanding of the requirement into evaluation criteria that are qualitative discriminators and will reveal substantive differences between competing products. In addition, establish criteria, based on the government's objectives, the marketplace, and

### Understanding The Requirement

***What is truly essential?***

(Without these characteristics you do not want the product.)

***What is important?***

(You are willing to pay more money for this capability.)

***What is nice to have?***

(But you are not willing to pay more for it.)

risks, that will differentiate between offers. All of these criteria must provide the basis for justifying the increased expenditure of funds for added benefits. The requirement and the general methodology the government will use to evaluate candidate products or services must then be clearly communicated to industry. Once industry understands the need and how the products or services offered will be evaluated, manufacturers can better determine what to offer. Keep these key points in mind:

- Limit evaluation criteria to key discriminators.
- Clearly communicate the requirement and evaluation criteria in the solicitation.

Document strengths, weaknesses, risks, and the associated value of proposals to support the source selection decision.

## ADDITIONAL REFERENCES

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"A Guide to Best Practices for Past Performance," Office of Federal Procurement Policy, Interim Edition, May 1995. Copies available from the Executive Office of the President's Publications Office, 202-395-7332, or by writing Office of Publications, 725, 17<sup>th</sup> Street, N.W., Room 2200, New Executive Office Building, Washington, DC 20503.

"The Best Value Approach to Selecting a Contract Source, A Guide to Best Practices," Army Materiel Command Pamphlet 715-3, Vol. 5, 16 August 1994. Available from the Defense Technical Information Center, 1-800-225-3842.

# CHAPTER 4

## LOGISTICS SUPPORT

### SUPPORT CHALLENGES

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The relatively short lead times required for fielding commercial and nondevelopmental items means that getting the necessary support in place requires non-traditional thinking about support. Although there is relatively little opportunity to lessen the burden of logistics support by influencing the design of these items, the acquiring agency can, by using supportability as one of the selection criteria, influence the selection process.

#### Risk Factors

Program risk operates differently under the compressed time frame of commercial and nondevelopmental item acquisitions. Three traditional areas of program risk—technical performance, cost, and schedule—are well defined: market surveys determine cost and technical specifications, and schedule and delivery dates are determined in preliminary discussions.

The fourth area of program risk, supportability, cannot be as easily defined. It is very tempting to assume that there will be no adverse supportability impact on a program when an adequate technical performance/cost/schedule candidate is immediately available. Remember, however, that the risk relative to cost effective support may be much higher than the risk in the other three areas.

Recognize the inherent supportability risk of a commercial or nondevelopmental item. Ensuring that the candidate system can become compatible with the operations and support infrastructure is a significant part of the market investigation. More program

#### **An Innovative Approach to Support**

For the Mobile Subscriber Equipment program, the contractor was required to bid spare parts and logistics support for 15 years after the last system was delivered to the government. A 15-year requirements-type, fixed price (adjusted for escalation) contract was executed. A waiver to the provisions of the Federal Acquisition Regulations (FAR), which limited contract duration to 5 years, was obtained. Actually, the project office obtained an overall waiver to all provisions of the FAR not pursuant to law.

resources should be devoted to addressing life-cycle support as more of the quantifiable program risk areas become known.

Given these inherently higher program risks in the areas of life-cycle cost and supportability, an acquisition decision must not be made until tradeoff factors are identified, analyzed, and compared with other alternatives. This principle is less pertinent where support will be a contractor responsibility over the life of the item, with little chance of organic repair.

Commercial item and NDI acquisition does have an advantage in terms of providing accelerated logistics support, however, because the item has an existing support system. Programs using commercial or nondevelopmental systems or equipment should maximize the use of existing logistics support capabilities and data. Development of new organic logistics elements for commercial items and NDI should be limited to meeting a critical mission need or achieving substantial cost savings.

## **Modifications**

Minimizing modifications to a commercial or nondevelopmental item preserves the option of using the existing support infrastructure and arrangements. As an item is modified, the ability to patch into existing support deteriorates quickly and support becomes more difficult. You should also avoid modifying the existing support system itself (and the accompanying documentation); select support systems that meet the need without modification, if available. Remember: modifications drive up cost and introduce risk. Existing support may be contractor support, established organic support, or, for commercial items, the commercial support infrastructure.

## **Upgrades**

Plan for frequent product upgrades when buying commercial items. Competitive pressure and evolving technology result in frequent product changes and

## CHAPTER 4: LOGISTICS SUPPORT

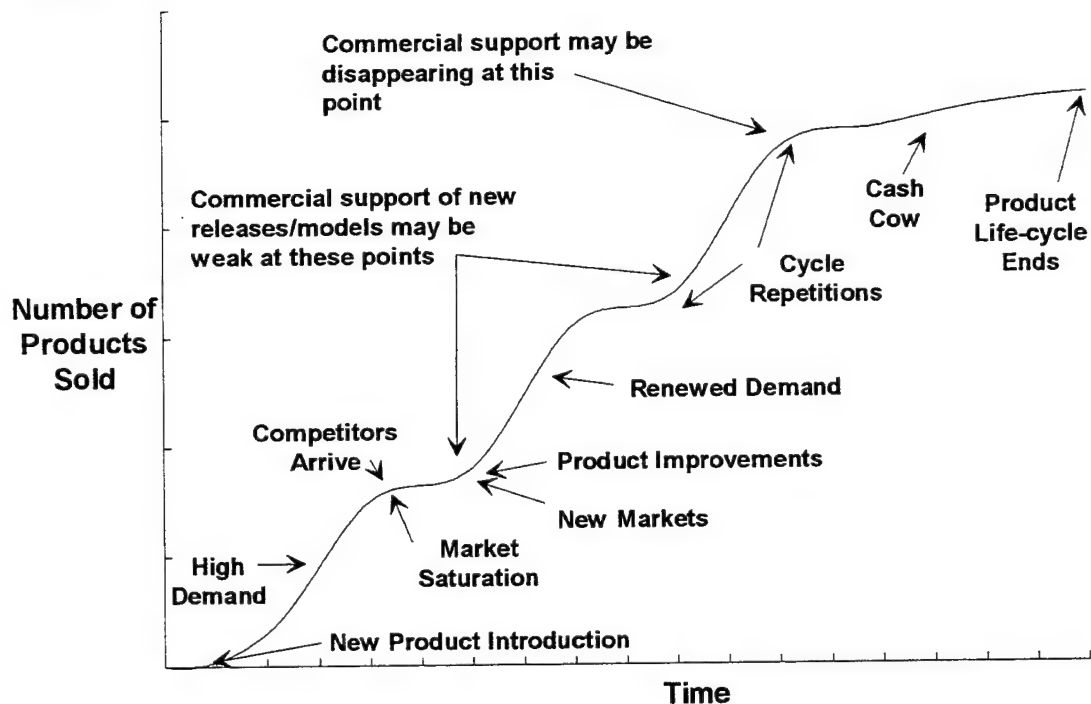
improvements. Take advantage of commercial service, repair, and spare parts distribution systems and practices (identified during market investigation) for supporting items and for incorporating item upgrades.

Consider the reasons for using a commercial item in developing logistics support. For example, if one of the goals of using a commercial item is access to state-of-the-art technology, support arrangements should allow for product upgrades or change-outs.

Remember:  
If an item is being used, it is being supported.

You should also consider the product life-cycle. When you buy an existing product, you should analyze, from the market viewpoint, the current stage of the product and take into account the implications for logistics support. The various phases that products go through from introduction to end of production are shown below.

### LIFE CYCLE OF A PRODUCT



## LOGISTICS SUPPORT PLANNING

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Commercial/NDI supportability is an issue that must be addressed up front.

The specific goals of the logistics support program for a commercial or nondevelopmental item are to:

- Influence the selection of the item based upon logistics considerations and best value.
- Negotiate appropriate logistic support.

A modified logistics support process can be used to accomplish these goals.

## MAJOR LOGISTICS PLANNING STEPS

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Logistic considerations must be addressed during the selection of a commercial or nondevelopmental item.

The major steps required to ensure that adequate logistics planning has taken place are described below.

### LOGISTICS PLANNING STEPS

- ✓ Step 1. Review operational requirements.
- ✓ Step 2. Identify and obtain support data.
- ✓ Step 3. Analyze support data.
- ✓ Step 4. Make operational assessment decision.
- ✓ Step 5. Provide for interim support, and develop interim logistics support plan.
- ✓ Step 6. Develop and assess final support plan.

Selecting a commercial or nondevelopmental item does not imply that any of the elements of logistics

support can be ignored. The support elements of commercial and NDI candidates must be thoroughly assessed during the market investigation because logistics support remains a critical factor in the decision as to whether a commercial or NDI selection is feasible. In arriving at a decision regarding support, remember that departure from traditional methods of getting logistics support may be required.

Consider the range of possible support methods in light of these use factors. Support methods range from no support, which implies disposal upon failure, to full organic support. The range includes full contractor support and combined contractor and organic support. The proposed item and its system use factors should guide the planning of the support strategy. Consider the following item-use factors in developing a logistics support strategy for a commercial or NDI acquisition:

**How will the item be specified—from "as is" to a fully militarized modification?** If the item has been modified to the extent that the existing support process would also require significant modification then perhaps total contractor support is not feasible.

**Where will the item be used?** (i.e., in what environment—from a fixed/industrial/benign one to a mobile/austere/hostile one—will it be used?) Will the military environment change the item's reliability characteristics? Or will the environment significantly change the manner in which the item must be repaired? If so contractor support might not be the best approach.

**How long will the system be used?** (i.e., What is the system's projected service life?) If the system will only be in the inventory for a few years then contractor support might be preferable to a lengthy and costly gearing-up of an organic logistics support structure.

**How much of the software is mature? How much is customer unique?** Software, never delivered 100% "bug-free," may take several years to mature. The logistics support structure should also address software maintenance of potential user requirement upgrades.

#### Logistics Support Strategies

- Discard upon failure
- Total contractor support
- Organic and contractor support mix
- Total organic support

**What is the need for system replacement or upgrade due to changing technology?** These questions concern how readily an organic support structure can keep up with changes in the system and modify the support strategy. If it will be difficult or impossible, then contractor logistics support is preferred.

**Why is a commercial or nondevelopmental item being selected?**

The use of a commercial or nondevelopmental item does not necessarily preclude the consideration of any support element.

- To take advantage of an advancing technology (with changing configurations)?
- Because of the availability of a proven, stable design? If the design is stable then perhaps organic support is the best approach because the configuration of the item will not change. On the other hand, a proven, stable design that has been around a long time may have fostered a world-wide, inexpensive support structure readily available to military users.

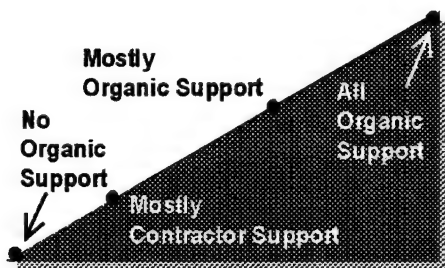
## LOGISTICS SUPPORT ELEMENTS

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The unique support considerations of commercial items and NDI must be evaluated within the context of the logistics support elements. Opportunities and challenges associated with logistics support elements are described in this section.

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### Logistics Support Spectrum ..... Considerations



- How much has the item or software been modified?
  - How long will it be in the inventory?
  - Where will it be used and maintained?
  - Is the design stable?
  - When will it be used?
-



## Maintenance Planning

Existing commercial or other service maintenance facilities may be able to replace or supplement existing organic maintenance facilities; reducing life cycle costs, personnel, training, and documentation requirements. If the item must be supported and maintained by the user, the maintenance plan for the item and supporting data must ultimately be purchased.

If a system or piece of equipment requires organic support, avoid or limit the amount and duration of interim contractor support. Maintenance plans must meet all program requirements (economic, readiness, performance, operational, and safety).

The challenge will be how to best use existing commercial or other maintenance and support systems. Factors for consideration include:

- The degree to which manufacturers, other military services, or other sources already provide maintenance support to existing customers.
- The responsiveness of such support activity to meet military requirements in peacetime and wartime (mean logistic down time, need for priority service, wartime surge, etc.).
- The degree to which the military service will be able to provide organic maintenance support, and the need for support facilities or a training and rotational base for service technical personnel.
- A need to minimize "down time."

Manufacturers of commercial items may be willing and able to support their products with preventive maintenance, repair parts, and technical personnel through the item's expected service life. Possible support strategies might include:

The Transportable Automated Weather Distribution System uses an innovative approach to acquire the necessary support for deployment. While the system is in garrison, it is supported by total contractor logistics support. For deployment, organizational-level support becomes the responsibility of the squadron which has a 30-day spares kit which can be replenished within 24 hours. The contractor is required to provide training for the bluesuit maintenance as part of the contract.

- Return to factory for repairs—possibly with a pool of replacement items to minimize turnaround time.
- On-site repair by contractor personnel.
- Provision of test equipment, procedures, and parts for intermediate or depot-level repair.
- A combination of the above.

If organic support is unavoidable, the initial maintenance concept frequently accepted for commercial items or NDI is to make the user organization capable of fault isolation to the line replaceable unit. Built-in test equipment or the use of test measurement and diagnostic equipment test procedures provides this capability. The maintenance technician in the user organization removes the lowest line replaceable unit and replaces it with a working element, sending faulty units to the intermediate maintenance activity or depot. Intermediate facilities stock units for direct exchange purposes. Items not replaced at the intermediate level are shipped to a depot. Depots usually repair to the piece-part level. You must identify criteria and subsequent maintenance concepts and formulate transition plans when required.

Developing maintenance plans is a subset of supportability analysis. Supportability analyses form the basis of good maintenance planning. They provide the data and information needed to make sound support decisions. However, allow contractors to use their existing data in its existing format whenever possible.

## **Manpower and Personnel**

Consider the number of people and levels of skill required to operate and maintain a commercial or nondevelopmental item for all planned support and maintenance levels. Specific areas influencing acquisition decisions should include:

- Number and type of people required for operation.

- Number and type of people required for maintenance.
- New skills, knowledge, or grades required.

Manpower and personnel activities begin during formulation of the operational requirement. For a commercial or nondevelopmental item, determine if the configuration meets manpower and personnel criteria. If it does not, reevaluation of the basic acquisition decision or modification of the initial support concept will be necessary.

## Supply Support

Capitalize on the availability of item history and previous user experience in determining supply support. Parts lists and repair kits, as well as parts usage data, may be available from the manufacturer. Manufacturer and other historical usage data will significantly aid in the accurate prediction of initial provisioning requirements for repair parts and related support equipment and help estimate follow-on provisioning needs. However, be cautious: government-unique modifications to a commercial item or NDI may invalidate manufacturer and other historical data. Usage factors include service life, environment, and other factors that may differ between the intended military application and the original design application. For example, military systems generally have a longer expected service life than their commercial counterparts. Acquisition managers should take into consideration the possible obsolescence or discontinuation of production of the replacement parts needed to sustain or repair fielded hardware.

The effect of commercial items on the military supply system must be considered. Investigate alternative supply methods and employ them where cost-effective. Some possible alternatives follow:

- Component manufacturers or vendors store and distribute spares and repair parts as needed. (Just in time support.)

- Prime system contractors provide supply support.
- Replacement end items are purchased as needed. (Discard upon failure.)

**Use commercial  
"after market"  
support when  
available.**

Some commercial products have substantial "after market" support infrastructures. For example, there is a thriving market for automobile parts and components.

A major logistics consideration in commercial item acquisitions is the need to provide support for items that change from one procurement to the next. These changes strongly affect the logistics system because each time a new item is brought into the inventory, new manuals and parts will have to be procured while, simultaneously, the existing equipment has to be supported. Thus, contractor support is usually a better alternative. Use of a multi-year procurement contract with a single source avoids this problem.

A similar alternative is to limit follow-on procurement competition for the purpose of standardization. Part 6.302-1(b)(4) of the Federal Acquisition Regulation addresses the use of other than full and open competition when necessary for standardization purposes.

## Support Equipment and Test and Measurement Systems

Requirements for support and test equipment must be identified as early as possible and included in organization authorization documents. Use of DoD standard test equipment (which may be commercial) instead of unique test equipment recommended by the manufacturer is preferred, but may not be feasible for a commercial item. The need for new calibration standards and procedures to support the required test equipment must also be determined.

## Technical Data

Technical data for logistics support includes specifications, drawings, technical manuals, calibration procedures, and other data required to test and inspect, perform preventive and corrective

maintenance, operate, and repair the item or its parts. The technical data required must complement the maintenance and supply support strategies. Where suppliers claim proprietary rights to data, as is normally the case for commercial items, the logistics manager should validate the supplier's claim and carefully review the data requirements to avoid buying unnecessary and expensive data rights.

Consider alternatives to acquiring commercial technical data rights. One possibility is to include contract provisions providing for the transfer of the data package and rights to the government in the event that the original manufacturer goes out of business or drops the particular item from production. Also consider including contract provisions allowing government use of data as necessary—but not for procurement purposes.

## **Training and Training Support**

Overall training requirements have to be determined on an expedited basis. Maximize the use of existing training and training support and consider permanent use of contractor training, especially for commercial items. Contractor assistance is required for initial training on new equipment and for establishing the institutional training base. If training aids or devices are required, you may need to arrange for the use of contractor-owned or contractor-provided equipment.

## **Facilities**

Because of the compressed schedule of commercial item and NDI acquisitions, it is important to determine the space, and environmental requirements that will be necessary to support the item.

Early logistics considerations include defining the types of facilities that will be needed, the location of appropriate facilities, and any improvements that will need to be made to existing facilities.

## Packaging, Handling, Storage, and Transportation

### Transportability

The purchase description for the CUCV (the Army's version of the Chevy Blazer) required that, "Vehicles shall be equipped with towing and tiedown devices which when fully loaded shall be adequate for highway, rail, sea, and air transport."

Before completing the solicitation package, determine requirements for packaging, handling, storage, and transportation consistent with commercial practices. When necessary, transportability experts should participate in precontract award negotiations to avoid the high cost of post-production modifications.

### Computer Resources Support and Design Interface

Open system and modular design approaches ease design interface problems, allowing for cost-effective innovation, upgrades, and flexibility. These approaches allow us to capitalize on rapidly evolving technologies and to minimize being held captive to specific products.

An open system is characterized by the following:

- Well defined, widely used, non-proprietary interfaces or protocols.
- Use of standards that are developed and adopted by industrially recognized standards bodies.
- Explicit provision for expansion or upgrading through the incorporation of additional or higher performance elements with minimal impact on the system.
- Definition of all aspects of system interfaces to facilitate new or additional system capabilities for a wide range of applications.

During all life-cycle phases and as part of the market investigation, the design characteristics are evaluated in terms of supportability, cost, and compatibility with support equipment. These considerations should be resolved early in the needs determination process because of the limited capability to affect design in a commercial item or NDI acquisition.

## Open System Characteristics

An open system implements sufficient open specifications for interfaces, services, and supporting formats to enable properly engineered components to be utilized across a wide range of systems with minimal changes; to operate with other components on local and remote systems; and to interact with users in a system that facilitates the transfer of a system, component, data, or user from one hardware or software environment to another.

### Open Systems in Action

The Navy's Advanced Display System (ADS) uses commercial computer technology, adopts industry electronic standards architectures, and applies "best commercial practices" to Navy display and processing applications.

The ADS, built around an open system architecture, will accept transparent technology insertion of emergent commercial products throughout the program's life.

This Naval Sea Systems Command acquisition also has a five-to-one cost reduction over the systems currently in use.

## SUPPORTABILITY ANALYSES AND PRODUCT SUPPORT DATA

Supportability analyses are integral to the development of the market investigation and contract requirements document or product description. They must be initiated early in the process and be based upon the user's readiness and operational requirements. Product support data will be needed to determine the required support resources. Allow contractors to submit data using their own formats and data systems.

## LOGISTICS SUPPORT RESOURCES

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Identify overall support resources (funding and manpower) as part of the early acquisition life-cycle process. Where necessary, reprogramming to fund additional support resources may be required to support both government and contractor efforts. In particular, funding requirements or estimates should be a key factor up front in the decision to use commercial items or NDI.

## SUPPORTABILITY TEST AND EVALUATION

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If commercial testing does not address the intended military environment and you can't obtain equivalent information from existing sources, test and evaluation may be required. This testing will determine or verify suitability and supportability of the item. Independent evaluation results—provided to the developer and the user—may impact trade-off analysis, source selection, and the support strategy.

## CONFIGURATION MANAGEMENT AND CONTROL

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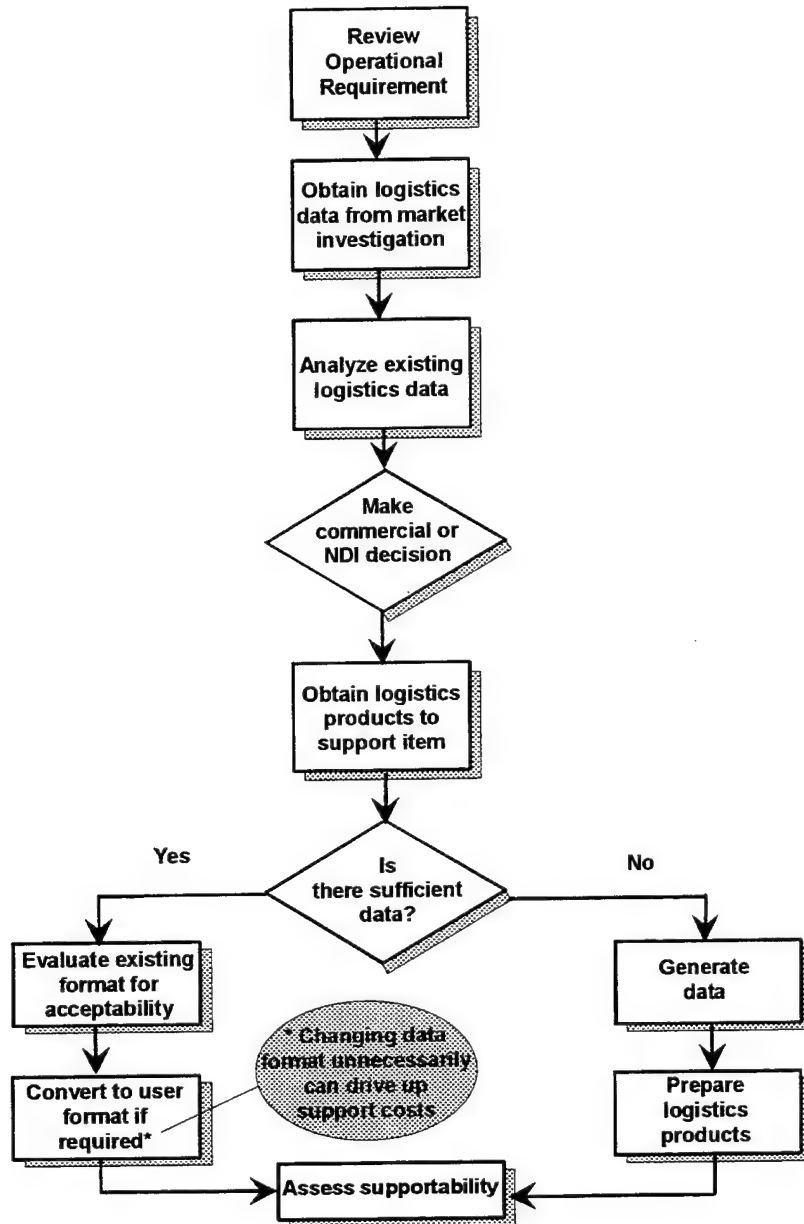
The Marine Corps Light Armored Vehicle (LAV) program production contract contained an innovative provision to protect the government from configuration changes. The LAV 25 Buyback Plan required the contractor to compensate the government for spares, repair parts, and special tools made obsolete by contractor design changes.

Configuration management and configuration control must be carefully evaluated when considering commercial and NDI alternatives. The ability of the user to adjust to possible configuration changes beyond his control, or even visibility, is the most important consideration. Over time, other users, commercial or military, will drive changes to the item that can affect the user's ability to support the item. Reliance on the contractor's existing configuration management system or obtaining contractor logistic support may be the best solution.

When the contractor is responsible for configuration control, the data requirement for engineering change proposals can be eliminated, reducing the amount of data the contractor must provide the government. Remember to keep data requirements to the minimum.



## LOGISTICS DECISION PROCESS



## ADDITIONAL REFERENCE

"Integrated Logistics Support Guide," May 1994,  
Defense Systems Management College Press, Fort  
Belvoir, VA 22060-5426.



# CHAPTER 5

## TEST AND EVALUATION

### PURPOSE

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An important advantage of many commercial item and NDI acquisitions is reduced acquisition cycle time. This reduction results primarily from decreased design and engineering time, but is partly achieved through decreased testing requirements—possible because of previous testing and general acceptance of the product in the commercial marketplace or in a previous military application. The general guidance for commercial and NDI acquisitions is to conduct testing only when existing data (contractor or other) is insufficient. Development testing is conducted only if specific information that cannot be satisfied by existing data is needed. It is important to obtain assistance from the developmental testing experts at an early point. Early participation by the military service's independent operational test agency is equally important. Together these testers can verify existing test data and plan for additional tests if required. Most testing of commercial items is operational testing since the product is already developed.

Except for the section on sample testing, the discussion of test and evaluation below is oriented toward large system and complex equipment acquisitions. Much of the test and evaluation process discussed is not appropriate for items of supply, consumable items, or commodities that are typically prequalified or tested at time of procurement.

#### Developmental Testing

Demonstrates that:

- Engineering design and development process is complete.
- Design risks are minimized.
- The system meets specifications.
- Its military utility is demonstrated.

### COMMERCIAL/NDI TEST AND EVALUATION

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Commercial item and NDI acquisitions need to be supported by a tailored test and evaluation process. The extent of the testing program for a commercial item or NDI acquisition depends on the type of item (modified, unmodified); similarity of the DoD intended use and DoD environment to the item's planned or current use;

## Operational Test and Evaluation

Evaluates a system's operational effectiveness and suitability by testing the system:

- Operated and maintained by typical users.
- In the environment and organization in which it will be deployed.

Don't test away time and cost savings by trying to completely eliminate risk—aim for risk management, not risk elimination.

For details on market investigation, see Chapter 3.

performance history of the proposed system or item; and the amount and quality of test data available from the original system development, or from the commercial producer.

A commercial item or NDI test and evaluation program has the following objectives:

- Ensure item meets operational requirements.
- Satisfy legal requirements, such as mandatory testing and reporting requirements for milestone decisions.
- Maximize the inherent advantages of using a commercial or NDI approach, such as user experience and test and performance history.
- Validate safety in the working environment.

You should address questions and issues related to test and evaluation in the market investigation. The developers, users, and independent operational testers should be involved in this early, but very important, test and evaluation activity. The purpose of the market investigation is to determine the availability and feasibility of using a commercial item or, if a commercial solution is not possible, an NDI solution. Therefore, any testing conducted during that phase should be limited and should serve only that purpose. The market investigation is not intended to compare different systems—but to verify availability and feasibility.

If market investigation supports a commercial or NDI solution, determine and document the remaining test and evaluation requirements in the test and evaluation plan. The plan should also include a summary of previous testing and results. Developers, users, and independent operational testers should work together to tailor test requirements and execution strategy. Specific tests required will vary with each individual acquisition. Testing should vary with the type and application of the item. Determine which of the following four situations applies:

**Commercial or nondevelopmental item intended to be used in the same environment and under the same**

**conditions for which it was designed.** Development testing is normally not required before production qualification testing. Operational testing is required when organic maintenance is a necessity.

**Commercial or nondevelopmental item intended to be used in an environment different from that for which it was designed.** Early qualification testing will probably be required in the operational and maintenance environment. Pre-production qualification testing will be required if early qualification testing leads to modification of the original item. Production qualification will be required. Operational testing will be required.

**Commercial or nondevelopmental item intended for integration into a larger system.** Feasibility testing to qualify a test sample should be conducted before the item is integrated into the system. Pre-production testing of the complete system is required. Hardware and software integration testing will be necessary.

**Commercial or nondevelopmental item that has been modified.** Testing focuses on the modification to ensure it meets the operational requirement and does not negatively impact overall operation.

A frequently used approach to early qualification assessment is to purchase a few candidate items and put them in the hands of the users to determine if they will work in the operational environment.

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## CHALLENGES

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To perform appropriate testing and evaluation that gives the program manager and the decisionmaker the information necessary to determine program progress, it is absolutely essential that requirement documents clearly and unambiguously state required capabilities, operating environments, and interfaces. To this end, test and evaluation team review and comment on draft requirement documents is critical. Unnecessary or redundant testing can be significantly reduced if the draft operational requirements document (ORD) is reviewed by the test and evaluation community before it is finalized. The test and evaluation representative should also participate in a multi-disciplined team (integrated process team) to plan the test strategy for the program. Many of the problems in a commercial item or NDI acquisition can be traced to an

inappropriate mindset. In testing, as in all traditional functional areas, the orientation is toward traditional developmental approaches to test and evaluation. For commercial and NDI acquisitions an orientation that involves less testing and greater reliance on data from external sources is needed. The case study presented in Appendix D demonstrates this approach.

Another impediment is a lack of experience with commercial test practices and standards. To avoid redundant testing, you must understand to what standards commercial or other product developers tested their systems and be open to accepting their results in lieu of DoD testing.

## SAMPLE TESTING

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### **Product Sample versus First Article Testing**

Product samples allow hands-on knowledge of an item before contract award. Because first article testing occurs at initial production after contract award, much time is lost if you discover that a contractor can't make an item to meet the DoD need at the time of initial production. A product sample approach is more efficient—especially when buying commercial items.

One definite advantage in buying a commercial or nondevelopmental item is that you are dealing with a known product, one which can be seen, operated, and tested. The use of a product sample is one way to screen items during the solicitation process. You can use a product sample to:

- Verify manufacturer's claims regarding performance and quality.
- Test for effectiveness in a military environment.
- Determine the acceptability of intangible item characteristics like ease of use, taste, or feel.
- Evaluate against source selection criteria.

When you include a sample requirement in a solicitation, you should:

- Identify the number and size of samples required and where they should be sent.
- Clearly describe in the product description or solicitation the item characteristics you will be evaluating.
- Describe how installation and operation of

the sample will be handled

- Address responsibility for transport, delivery, and the disposition of samples after evaluation is complete.
- Address waivers for previously tested or approved items.

Part 14 of the FAR, "Sealed Bids," contains additional guidance on the use of bid samples specifically in a sealed bid acquisition.

## FOREIGN COMPARATIVE TESTING PROGRAM

The Foreign Comparative Testing (FCT) Program is a congressionally mandated effort that supports U.S. policy of encouraging international armaments cooperation and helps reduce overall DoD acquisition costs by facilitating the procurement of foreign nondevelopmental items.

FCT involves the test and evaluation of items of defense equipment developed by U.S. allies and other friendly nations to determine whether such equipment can satisfy requirements identified by the military services and the CINCs to correct mission area shortcomings.

Candidate projects are nominated annually by the military services to the Office of the Secretary of Defense. Projects that survive the screening process are prioritized by order of merit, and a summary of the recommended projects is provided to Congress for use in its authorization and appropriation actions for the upcoming year.

FCT funding supports lease and procurement of foreign test articles and subsequent test and evaluation by the sponsoring service. Priority for FCT funding is given to test and evaluation of NDI equipment which demonstrates good potential to satisfy U.S. requirements with little or no modification. As a low priority, technical assessments of foreign equipment or systems may be conducted. Testing of U.S. items involved in side-by-side comparisons with foreign items is not funded by the FCT program. Costs associated with the testing of

### A winning strategy for an FCT project considers:

- ✓ User advocacy?
- ✓ Satisfaction of formal requirement (ORD or Mission Needs Statement)?
- ✓ Identification of service procurement dollars for follow-on acquisition?
- ✓ Market survey of U.S. and foreign sources?
- ✓ Item in production?
- ✓ Operational use in a foreign country?
- ✓ Identifiable performance, cost, and scheduling advantages?
- ✓ Service contribution and cost sharing?

U.S. items are borne by the appropriate service and/or U.S. Special Operations Command.

Generally, projects approved for test and evaluation through the FCT program are funded for no more than a two-year effort. However, on an exception basis, test and evaluation of complex systems may be funded for a longer period.

**DoD 5000.3-M-2**  
provides detailed FCT  
program guidance and  
procedures.

Candidates for FCT funding must meet the Candidate Nomination Proposal criteria. The selection or rejection of a proposal depends on the extent to which it satisfies the criteria described below:

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## CANDIDATE NOMINATION PROPOSAL EVALUATION

The nomination of a system for the FCT program should:

- Demonstrate that the system meets a requirement for which there is no existing U.S. system or provides significant cost, schedule, or performance advantages over an existing U.S. system.
- Support the above conclusion with a thorough market investigation.
- Establish that there are no offshore procurement restrictions.
- Identify funds available to procure equipment that will meet the requirement against which the foreign item is being evaluated.
- Identify any potential for establishing a U.S. source to produce the item.
- Show the willingness of the DoD component to share costs and address the willingness of the foreign government or industry to do the same.
- Address: 1) allied interoperability and support considerations, 2) other DoD components' interests in the item, 3) security concerns, and 4) end-use certification requirements.



The FCT Program is administered by the Office of the Director, Test, Systems Engineering and Evaluation; Office of the Under Secretary of Defense (Acquisition and Technology). Questions concerning the FCT Program are welcomed through the service points of contact to the FCT manager.

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## POINTS OF CONTACT

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U.S. Army	Office of the Assistant Secretary of the Army
Director for International Programs	
103 Army Pentagon, RM 3E416 SARD-IN	
Washington, D.C. 20310-0103	
Tel: 1-703-697-7879; Fax: 1-703-695-7277	
e-mail: themak@pentagon-hqdad.s army.mil	

U.S. Navy/Marines	Navy International Programs Office
111 Jefferson Davis Highway	
Crystal Gateway North, Suite 701E	
Arlington, VA 22202-1111	
Tel: 1-703-604-0220; Fax: 1-703-604-6563	
e-mail: jmilligan@san.idss.ida.org	

U.S. Air Force	Office of the Deputy Under Secretary of the Air Force (International Affairs) SAF/IAQ
1745 Jefferson Davis Highway	
Crystal Square 4, Suite 302, Room 312	
Arlington, VA 22202-3402	
Tel: 1-703-607-3153; Fax: 1-703-607-3158	
e-mail: vanderws.iaq@saf-ia.hq.af.mil	

Office of the Secretary of Defense Test and Evaluation Center (TEC) 2001 North Beauregard St., Suite 800 Alexandria, VA 22311 Tel: 1-703-578-8222; Fax: 1-703-578-6580 e-mail: cattsrq@acq.osd.mil	Foreign Comparative Testing Program OUSD(A&T) D,T,SE&E-FCT
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# CHAPTER 6

## PRODUCT ASSURANCE

### INTRODUCTION

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Product assurance considerations for commercial item and NDI acquisitions include quality assurance, electromagnetic compatibility, reliability, and maintainability. While product assurance is important in all acquisitions, it is a much more involved process for system-level acquisitions, acquisition of complicated items, and acquisition of items with significant support requirements. This chapter addresses product assurance issues in the context of these three types of acquisitions. The concepts discussed apply to all acquisitions; however, specific steps and actions may not be appropriate for acquisition of items of supply or consumable items.

Product assurance for items of supply and consumable items is largely a function of the contract product description. In these cases, product assurance is achieved with an appropriate product description, one which includes verification, usually in the form of testing or visual inspection.

### QUALITY ASSURANCE

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Product quality is a central issue throughout the acquisition life cycle and includes quality of design, prevention of defects, and quality of conformance; or the extent to which the item conforms to the design criteria or requirements. If a commercial or nondevelopmental item is already accepted in the marketplace, a quality program and history probably exist for the item. To be meaningful, the quality history should show product quality over time and the satisfaction of previous users. In-process quality data, such as process and test yields, can also be assessed to determine product quality.

## Warranties

Warranties are available for commercial equipment. The acquisition manager must determine whether an available warranty is translatable to the intended use and whether its use would be cost-effective. These determinations should consider the need to establish logistic channels for turning-in items for repair, and the cost of reimbursing maintenance facilities for their repair efforts or the scrap of the items. You should base any decision to modify existing or standard warranty provisions on a cost/benefit analysis. The availability of a suitable warranty may be a critical attribute in the decision to use a commercial item or NDI.

## Reliability

As noted in the discussion of basic concepts, military equipment must meet a military need and function in the military mission environment. Reliability, with its impact on operation and support costs, must receive critical attention in the market investigation, solicitation, and source selection process. In the traditional acquisition process, the developer typically inserts reliability requirements in the system specification and development specifications and incorporates tasks in the statement of work allowing the contractor to conduct a disciplined reliability program to achieve the requirements.

With commercial items and NDI, the basic product is already designed and its reliability established. Consequently, the reliability assessment should be an operational assessment of the military application in the expected military environments. This section provides guidance on reliability assessment and other areas to consider during the market investigation and solicitation.

Since the basic design of a commercial or nondevelopmental item cannot be controlled by the buyer, the objective is to determine whether well-established and sound reliability practices were applied during the item's development. During market research to determine commercial item or NDI feasibility,

include questions like the following to obtain the pertinent information:

- ***Briefly describe your overall reliability design program. What mean time between failure does your product exhibit? What are its build-in-test capabilities?***
- ***Describe the mission environment of your design.***
- ***Does your reliability design program include:***
  - ***Thermal analysis?***
  - ***Failure modes, effects and criticality analysis?***
  - ***Environmental stress screening?***
  - ***Reliability allocations and predictions?***
  - ***Shock and vibration analysis?***
  - ***Parts selection and qualification program including incoming inspection of critical parts?***
  - ***System and subsystem reliability testing?***

These questions are intended to illustrate the scope of the reliability issues to be explored. Not all commercial products will have accumulated the required reliability data or the extensive testing required for military qualification. However, some items will have substantial market-generated performance data. This data may actually be more extensive than that generated through testing programs or experimental use. This market data can be useful even when more demanding environments are anticipated.

If you can't adequately assess reliability with the available market investigation data, consider getting some typical products from the market for hands-on evaluation or requiring a product sample. You can also make reliability a factor in source selection, which is consistent with commercial practices.

Is the environment in which the commercial item is expected to operate the same as the environment for which it was designed?

Are the qualifications of the operators the same?

The amount of testing required to verify that a commercial item or NDI meets the operational requirement is governed by whether the item will be used in the environment for which it was designed and by operators with skills equal to the operators for which it was designed. If the environment and the operators are equivalent to the design environment and operators, you may be able to eliminate qualification testing based on the history of the item.

## Maintainability

In development programs, maintainability features are also designed into the product. The maintenance system for commercial items may differ from the DoD system. You need to evaluate the maintainability features of the commercial items—accessibility, interchangeable parts and components, standard parts, built-in-testing and maintenance equipment, and ease of handling—to determine if they are suitable for DoD use.

## Reliability and Maintainability (R&M) Requirements

Develop quantitative R&M requirements before Milestone 0, so that you can look at reliability levels for the available commercial or NDI candidates as part of market investigation and compare them to DoD requirements. You should consider trade-offs if the reliability and maintainability of the commercial or NDI candidates do not meet the original requirements. The criteria for evaluating reliability and maintainability for a commercial or nondevelopmental item are the same as for a development program.

Accurate quantitative R&M data may not exist, particularly for commercial items. When it is available, evaluate it to determine if it is representative of use in the desired military mission or environment. When quantitative data is not available, you may still be able to review certain analyses—R&M predictions; failure mode, effects, and criticality analyses; thermal and stress analyses; even service and warranty records.

However, such alternative data is never as good as actual performance data based on operational history. Since commercial items are readily available, hardware testing is a viable alternative to relying solely on paper analyses.

You can also request and review any reliability and maintainability analysis that the manufacturer performed in the development of the item. Use the R&M requirements stated in operational requirements, or those resulting from trade-off analysis, as a baseline for R&M assessment. When quantitative data is not available, it may be possible to assess relative reliability and maintainability values. Use any of these methods or a combination to get enough data to assess the viability of a commercial item or NDI approach and to determine how to make it work best in the DoD environment.

If the market investigation does not yield sufficient data to resolve the reliability and maintainability issues, testing may be needed. Program office, functional area activity, and test activity personnel should coordinate planning and execution of testing programs and provide test alternatives to the decisionmaker. Avoid requesting test data in rigid formats: accept any valid data that answers essential reliability questions.

If the market investigation or testing demonstrate that available equipment cannot meet R&M requirements, consider the following alternatives.

- Require total contractor logistics support, including a requirement to meet a specified operational availability.
- Scrutinize existing mission profiles or basis of issue to determine if the demonstrated reliability and maintainability values of the potential commercial or nondevelopmental items are acceptable under different circumstances.
- Purchase sufficient replacements to meet the specified operational availability.
- Modify the commercial or nondevelopmental item to meet R&M requirements.

Depending on the information gathered during market research and life-cycle cost analysis, reliability and maintainability program tasks may be waived or partially implemented in an commercial or NDI acquisition. Employ safeguards to ensure that waivers are used when needed, not to make the procurement easier. You may need to perform follow-on evaluations on those items that have demonstrated marginal reliability and maintainability characteristics during qualification tests.

## Electromagnetic Compatibility

When electromagnetic compatibility is a requirement of the DoD mission or environment, you will need to assess commercial candidates to determine if they are acceptable as is, or with modification. Changes implemented to correct electromagnetic compatibility problems in an operational commercial item can be time consuming and very costly. Electromagnetic compatibility problems can present a potentially hazardous situation resulting in loss of life, damage to hardware, or degradation of mission performance capability.

Prior to Milestone 0, analyze the established electromagnetic compatibility parameters and compare them to the characteristics of potential commercial or NDI candidates identified during market investigation. The criteria for evaluating electromagnetic compatibility are the same as for a development program.

Many approaches can be taken to gather valid data during the market investigation. You can request and review any electromagnetic compatibility analysis that the manufacturer performed during design and development of the item. Use the electromagnetic compatibility requirements stated in the operational requirement as a baseline for electromagnetic compatibility assessment. When quantitative data is not available, try assessing relative electromagnetic compatibility values. These approaches and others should be used to obtain enough electromagnetic



compatibility data upon which to support a decision to use a commercial or nondevelopmental item. If the market investigation does not yield sufficient data to resolve electromagnetic compatibility issues, test as a last resort. When high electromagnetic levels exist or safety factors differing from the design environment are involved, you may need to test the commercial or NDI candidate to ensure satisfactory performance and safety.

When market investigation or testing demonstrates that available commercial or NDI candidates cannot meet electromagnetic compatibility requirements consider:

- Reviewing mission profiles to determine if the demonstrated electromagnetic compatibility values of potential commercial or NDI candidates are acceptable.
- Shielding or isolating the item.
- Modifying the item to meet electromagnetic compatibility requirements.
- Tailoring the electromagnetic compatibility program for acquisition of commercial items based on the information gathered during market and life-cycle analysis.



# APPENDIX A

## PREPARATION AND USE OF COMMERCIAL ITEM DESCRIPTIONS

### INTRODUCTION

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You will find basic guidance and procedures governing the content, format, and language style of commercial item descriptions (CIDs) in Chapter 6 of the General Services Administration (GSA) Federal Standardization Manual. This appendix provides additional information on developing the two pivotal sections of a CID: the salient characteristics and quality assurance provisions. It also includes additional guidance on the development and use of market acceptance criteria.

### SALIENT CHARACTERISTICS

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**Salient characteristics are the important technical aspects of an item that provide a definitive basis for its acceptance or rejection.** You should base the salient characteristics included in a commercial item description on two sources:

- information you receive during the market investigation, and
- information on the overall requirement you receive from communication with the users.

As you would in any product description, state the salient characteristics in terms of function and performance to the extent practicable. Do not include requirements that dictate how to produce an item. Include design characteristics such as dimensions, material, composition, and formulation only when design control is necessary to meet an interface requirement, such as the interchangeability of replacement parts. When you must include design

characteristics, allow as many acceptable alternatives as possible. Identify the characteristics and terminology accepted by commercial industry to describe the item and use them to the extent practical in describing the item.

When a salient characteristic depends on a specific test or verification method, identify the characteristic and test method together. For example:

"The mandrel shall have a hardness of not less than 60 or more than 65 on the Rockwell "C" scale."

"The tensile strength shall be 1,100 psi minimum when tested in accordance with ASTM D412."

Consider displaying the characteristics, values, and test methods in a table. This approach provides a succinct and clear way to communicate the requirement and simplifies the CID.

**Referencing defense or federal specifications and standards in CIDs is discouraged.** Referencing nongovernment test methods and standards is the preferred method for incorporating technical characteristics, materials, and testing procedures. Use recognized commercial test methods and units of measurement.

A CID can be used to supplement an existing nongovernment standard that comes close to describing the DoD requirement. In these cases, the nongovernment standard, supplemented as necessary, will form the basis for your CID. For example:

"The lamp shall be in accordance with ANSI standard C78.105 and have the following additional characteristics:

1. Design volts - 6.4.
2. Screw terminal.
3. Hemispherical shield is in front of filament which masks all direct light."

**Determining the appropriate salient characteristics is a very item-specific, technically demanding task.** In the end, these determinations are based on your judgment as the technical expert or engineer assigned responsibility for the item. However, user input and feedback, information identified during the market investigation, industry comments, and the input of the buying activity are essential considerations. Consider using the following techniques to identify the salient characteristics initially and to keep them up-to-date as user requirements and technology change:

- Test and evaluation of product samples.
- Participation in symposiums and workshops conducted by the industry, user, or buying activity.
- Attendance at industry trade shows.
- Review of technical journals and product brochures and catalogs.
- Discussions with manufacturers.
- Obtaining user feedback on items previously supplied.
- Acquisition of industry comments on draft CIDs.

## QUALITY ASSURANCE PROVISIONS

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Use quality assurance requirements in a CID that are consistent with the commercial practice for the item described. Information obtained during your market investigation on the normal commercial quality assurance practices should shape the requirements you include in this section.

A CID can include the following provisions in the quality assurance section—in addition to a general quality statement, which is mandatory:

- requirements for product samples,

- testing and inspection,
- and market acceptance.

You should choose among these options, or a combination of these options, depending on the type of item you are describing. For example in some industries manufacturers supply product samples as a standard practice and samples are commonly used to judge workmanship and product quality.

Market acceptance requirements are especially appropriate for use in a CID since a CID is typically used to buy existing commercial items, which have a sales and performance history. However, market acceptance would not be appropriate in a CID describing a product that is revolutionary, differing significantly from commercial items previously sold.

## General Quality Statement

Include the following general quality statement, or a tailored version, in every CID as the first paragraph under quality assurance provisions:

You can—and should—tailor the general quality statement to suit the particular item.

“The products provided shall meet the salient characteristics of this commercial item description, conform to the producer’s own drawings, specifications, standards, and quality assurance practices and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.”

The inclusion of a certification statement in a CID is mandatory; however, you can and should tailor the above sample to suit the item you are describing. For example, if you include a market acceptance requirement that allows government-only suppliers, you should not include in the phrase—“and is the same product offered for sale in the commercial marketplace,” but this phrase might well be included

otherwise. You may also want to tailor the statement if a product sample or bid sample is required.

## Product Samples

When necessary to assure product quality, product samples may be required in a CID and incorporated into the certification statement. For example:

“The products provided shall meet the salient characteristics of this commercial item description, conform to the producer’s own drawings, specifications, standards, and quality assurance practices, and be the same as the product provided to the Government as a product sample. The Government reserves the right to require proof of such conformance.”

List in the CID the characteristics for which the bid samples will be examined and judged. You may also want to include information on the number and size of samples, where the samples should be sent, and the final disposition of samples provided.

Regulatory guidance on the use of bid samples in *sealed bid procurements* is contained in Part 14 of the Federal Acquisition Regulations.

## Testing and Inspection Requirements

Testing and inspection requirements in a CID should be directed toward verifying compliance with the salient characteristics of the item as defined in the CID. Use accepted industry test methods when available.

Inclusion of requirements on how to inspect or sample is discouraged, but not prohibited. These requirements should be used only when consistent with commercial practice or when no other method of assuring quality is acceptable. Military standards should not be referenced. Justification for using “how to” quality assurance provisions should be documented in the CID file. If extensive military-unique quality assurance

requirements are necessary, a product description other than a CID should be used.

Part 11 of the Federal Acquisition Regulation contains regulations on the use of market acceptance.

## Market Acceptance

You may require an item to have achieved market acceptance if market acceptance is necessary to satisfy the Government's minimum needs. Accomplish this objective by including a requirement for the item to meet specific market acceptance criteria. Market acceptance criteria establish the threshold for determining whether an item is accepted in the market. The criteria you include can be whatever reasonably indicates that an item will meet the intended application, for example:

- Number of units sold annually
- Maintenance and logistics arrangements, such as availability of service and spare parts.
- Length of time an item has been in the market or available for sale.
- Reliability and performance of the item, such as percentage returns under warranty.

The criteria you choose should be:

- Based on information obtained during your market investigation.
- Constructed to include small businesses that are regular producers of the item, but may have relatively smaller sales.
- Related to the item itself not the supplier. (For example, if an item has demonstrated market acceptance based on sales quantity or time in the market, it doesn't matter if the sales record of a specific distributor or vendor bidding on the solicitation does not meet the criteria for the item.)



- Constructed to include items sold to the government. (For example, government sales quantities can be used to meet a minimum sales criterion. This provision is especially applicable when converting an existing MILSPEC to a CID.)
- Developed considering both the item and the market in which it is sold (for example, sold for industrial use).

If you use market acceptance criteria, you must write a justification relating to the government's minimum need. The justification doesn't need to be complex—just reasonable and real. The following examples of justifications in which market acceptance criteria were used and upheld were taken from actual protest case determinations:

- A modified commercial item is required to minimize design and engineering risk. A commercial item is required to assure that an established end product is routinely supported by spare and repair parts.
- A market tested item is required to preclude unproved or experimental units.
- Demonstrated reliability (developed products, product improvements, established quality control procedures, broad-based parts availability) is required to assure compliance with Federal safety and environmental requirements.
- A commercial item is required to ensure serviceability, reliability, and quality of materials.
- A currently produced item is required to help ensure up-to-date technology, especially in light of multiple-year contract duration and rapid advancement experienced in the technology.

Document market investigation information, minimum needs justification, and findings substantiating the market acceptance criteria, and retain them in the CID file. Be sure that the file describes the method, extent, and findings of the market investigation and identifies suppliers who met the market acceptance requirement.

Market acceptance criteria should be part of the Quality Assurance Provisions section of the CID. You may list suppliers known to meet the criteria in the Notes section of the CID. Also consider providing the name and phone number of the preparer or a point of contact in the Notes section, so the buying activity can easily obtain any information or additional documentation needed to support the market acceptance requirement.

# APPENDIX B

## MARKET RESEARCH CONSIDERATIONS

### EXAMPLES OF INFORMATION TO PROVIDE TO INDUSTRY

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#### General Information

Operating characteristics for hardware and software.

- Environmental conditions for use.
- Usage (e.g., fixed, airborne, tactically deployable).

#### System Interface or Integration Requirements

- Computer language, speed, throughput, ports, memory and expansion potential.
- Radio transmission frequency requirements and allocation status.
- Rules for Government use of frequency spectrum.
- Human factors considerations.

#### Maintainability Information

- Self-test requirements.
- Limitations, if any, on organizational-level support equipment.

## Communications-Computer System Interface Information

- Software portability to other communications-computer systems.
- Operating duty cycle (e.g., 24 hours, intermittent).
- Input power quality (drops, surges, spikes, noise).
- Essential safety characteristics.
- Reliability, Maintainability, and Survivability data.
- Nuclear hardening requirements.
- Chemical, biological, and radiological survivability data.
- Electromagnetic compatibility.

## Logistics Support Information

- Planned maintenance echelons.
- Maintainer proficiency levels.
- Software maintenance plans.
- Limitations on evacuation of reparable items (battlefield, underground, rough handling).
- Maintenance environment (weather, mud).
- Supply support, support equipment needs, limitations.
- Training needs.
- Technical data needs.
- Transportability.

## INFORMATION OBTAINABLE FROM MARKET INVESTIGATIONS

While the value, type, and complexity of the needed products will influence the data gathered, you may need to obtain the following categories of information from the market investigation.

### Product Availability Data

- Product quality, reliability, and maintainability experience of similar users.
- List of commercial and NDI products and company services satisfying identical or similar service requirements.
- Product descriptions used by other government activities or used in commercial transactions, including commercial specifications and standards.
- Stability of current configuration and technology.

Ask only for information you really need for acquisition planning and decisions.

### Industry Data

- Number of manufacturers.
- Size and location of manufacturers and their current market.
- Product distribution channels.
- Business practices in sales and distribution from manufacturers to wholesaler, distributor, or retailer, to user.
- Production capacity to meet requirements as part of commercial sales and the appropriate time to buy.
- Packaging, handling, storage, and transportation practices.

- Average time between model changes and practice of providing continued parts inventories, upgrades, or production for phased-out models.
- Length of time the product has been produced.

## Market Acceptance Data

- Manufacturer test results or results from independent test organizations.
- Product quality, reliability, and maintainability experience of similar users.
- Annual sales.
- Description of contractor's quality controls including extent of statistical process controls.
- Warranty terms and practices, annual returns under warranty.
- Need for any pre-production or production qualification testing and special quality assurance requirements.
- Product evaluation criteria (including life-cycle criteria, as applicable).
- Hardware, software, and manpower interface issues such as human factors and product safety as experienced by similar users.

## Product Support Data

- Repair parts availability and lead times, documentation, pricing, and distribution systems.
- Customer service, installation, checkout, and user operation and maintenance instructions.
- Requirements and provisions for manpower and personnel.
- Competitive or sole source repair and support base.
- Training and training support requirements.

- Requirements for and availability of tools, test equipment, computer support resources, calibration procedures, operations, and maintenance manuals.
- Warranty procedures and commercial repair capabilities.
- Manufacturer calibration, repair, and overhaul practices and capabilities documentation.
- Manufacturer commitment to out-year support.
- Degree of technical data package availability.

## SAMPLE MARKET INVESTIGATION QUESTIONS

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The following are examples of questions you can ask in gathering information to evaluate the potential opportunities for the use of NDI. These questions should be directed to potential suppliers. You can also send similar questionnaires to current commercial and military users of the products under consideration, especially when quality and logistics experience is critical to the decision to use NDI. For potential high-cost or critical commercial and nondevelopmental items, it may be beneficial to conduct on-site visits to manufacturers and their users to obtain the necessary information.

In addition to the following general questions, you should solicit specific questions peculiar to the item being acquired from functional discipline proponents, independent testers, and technical experts. This information (regarding performance, operation, and design features), must be included in the test and evaluation plan.

## Questions about the Item

***What portions of the system or equipment that you intend to provide are commercial items? What portions are other NDI?***

***Must the item be modified to meet requirements?*** If so, are you or your vendor(s), as applicable, willing to share design visibility and control with the government or arrange for licensing of other manufacturers?

***How stable is the design of the equipment?*** Give history and your perception of future stability prospects for each design proposed.

***How mature is the current design?*** What are your criteria for measuring the degree of maturity?

***How long has the item been on the market?*** How many are currently in use and in what environments? What are the prospects for product longevity? How long will you support the item?

## Questions about Reliability, Maintainability, and Survivability

***What is the reliability history of the product? In what environments?*** (e.g. mean time between failure, corrective maintenance actions)

***What are the maintainability features of the design?*** (e.g., self-test features, accessibility, need for separate support equipment to verify failures, preventive maintenance needs, mean time between repair)

## Questions about Logistics Support

***What are the existing maintenance, repair, and spare parts arrangements for the item?*** How are current customers supported?

***Are you able to support the item for the duration of the expected military use?*** The Department of



Defense tends to keep items in use longer than civilian users.

***Will you allow the government to acquire licensing and subscription services to enable competition for maintenance?***

***If the nondevelopmental item is to be used as part of a system, how do you perceive the criticality of interfacing with other subsystems, software, etc. for overall system integrity?*** That is, if it later became necessary to replace a subsystem because the original became unsupportable, could it be done without driving a major modification or replacement of the entire system? Are special tools or test, measurement and diagnostic equipment required?

***Can the proposed item be maintained according to the conditions we have given you, or will special arrangements be required?*** If so, what are they?

Is there a competitive market for contract repair and support of the proposed item, or is repair and support restricted to a single source?

***Is the proposed equipment covered by a warranty?***

What are the warranty's provisions? If your product will reach the Government through a prime contractor, will your warranty carry through with it? Identify at least three commercial users of your product. Also, name present military customers, if any.

***What training is needed to operate and maintain your product? What training sources are available to customers?***



# APPENDIX C

## CASE STUDY 1: THE PRECISION LIGHTWEIGHT GPS RECEIVER

### BACKGROUND

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A new technology that has revolutionized the world of position location is the NAVSTAR Global Positioning System (GPS). GPS is a DoD-developed, space-based, radio positioning and navigation system that provides precise location, velocity, and time information worldwide. It is comprised of three parts—a space segment of 24 satellites, a ground control segment, and the user. The user accesses the system with GPS receivers.

Although the system has only been fully operational for a short time, three generations of GPS receivers have been developed. The grandfather receiver is the AN/PSN-8 Manpack, an Army developed 17-pound receiver with a unit cost of over \$40,000.

The father is SLGR (Small Lightweight GPS Receiver). During the Manpack's development, commercial GPS receivers became available. The commercial version most attractive to the military (the SLGR, pronounced "slugger") weighed about four pounds and cost about \$4,000 each. The Army was examining the military utility of the system through a demonstration program when Operation Desert Shield began. In the trackless desert of the Persian Gulf region any GPS receiver was a valuable asset, and SLGRs were particularly valuable. The Army made an interim production buy of over 8,000 SLGRs for Operation Desert Storm. The SLGR has two limitations that military receivers do not have. First, commercial products cannot provide "military accuracy" because they do not have the selected availability function. Selected availability denies full system accuracy to potential adversaries (and commercial users) by intentionally degrading the accuracy of the satellite's signals. Military receivers all have the selected availability function and can upgrade

the signal to provide full accuracy. The second shortcoming of commercial receivers is that they do not have an anti-spoof capability. Spoofing is a technique by which an adversary might generate a fake GPS satellite signal that provides incorrect position information. Since a commercial receiver cannot differentiate between real satellites and spoofers, it may track the spoofer and provide incorrect information. GPS satellites transmit classified signals which defeat spoofers if the receiver has the means to use them.

These shortcomings were not a factor in the Persian Gulf war, but the military could foresee that they might be a serious factor in future conflicts. Meanwhile, the demand for GPS receivers, particularly in the Army, was increasing dramatically. In 1986, the Army foresaw a demand for only 900 ground receivers. By 1992, after Desert Storm and other operations, the demand had increased to almost 75,000. As a result, the Army determined that it needed a small, lightweight commercial GPS receiver that also had the selected availability and anti-spoofing capabilities. Enter the Precision Lightweight GPS Receiver (PLGR, read "Plugger").

## THE ACQUISITION PROCESS

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### Requirement Evolution

In November 1990, the Army, through the GPS Joint Project Office at the Air Force's Space and Missile Command, began to assess if commercial GPS receivers could be adapted to incorporate the Department of Defense's military-unique requirements. To reach a general agreement that an NDI strategy was feasible, the Army had to make tradeoffs in its requirements. The commercial products were not expected to match the performance of the AN/PSN-8 Manpack, even if the selected availability and anti-spoof modifications were incorporated. Accordingly, the Army amended its 1979 requirement for the Manpack to take advantage of commercial GPS technology. This amendment was done in parallel with the initial phase of the market survey.

The intent of the changes was to get a system, as an off-the-shelf item, that would meet minimum essential requirements, be affordable, be available in the near term, and be easy to operate. The challenge was to avoid letting "better" be the enemy of "good enough" by curbing the desires of the design engineers to optimize performance.

## Protests

As a result of the market survey, it appeared that several GPS manufacturers were willing to participate in the program and meet the requirement with an off-the-shelf device; that is, PLGR was sufficiently like their commercial products that they would not require an R&D contract to make any necessary changes. On the other hand, some GPS manufacturers objected to this approach because they were unwilling to make the modifications without R&D funding. The government acquisition team concluded that enough manufacturers were willing to participate in an off-the-shelf procurement. This conclusion was hotly contested within the government and by some manufacturers.

Those manufacturers who objected to the government's approach used the legal system to challenge the strategy during the solicitation phase. The project underwent two General Accounting Office protests, two Court of Claims Cases, and litigation at the Court of Appeals. The thrust of the challenges was that the vendor's existing commercial receivers required significant modifications to meet the requirement and therefore did not meet the Federal Acquisition Regulation definition of NDI. The challenges were defeated, and, through the strenuous efforts of the acquisition team, the contract award was delayed only 43 days from the original schedule.

One important outcome was that the PLGR project set a legal precedent that was upheld by the courts. The precedent was that government use of an NDI strategy was permissible even if a system did not exist at the time of project initiation, if it would be in production at the time of contract award.

## The Acquisition Strategy

The Department of Defense placed a number of constraints on the PLGR that greatly influenced the acquisition strategy:

- The selected availability and anti-spoofing capabilities of the PLGR must approximate that of the AN/PSN-8.
- The PLGR must be smaller than the SLGR, with human factors as good as or better than the SLGR.
- Production delivery must begin in 1993 or earlier.
- Both unit and life-cycle costs must be the lowest possible. The goal was to meet or beat the SLGR unit cost (\$4K) and four-year warranty.

During the period November 1990 through June 1991, a government performance specification was coordinated with industry and the government. Several responses from industry indicated that a product that would meet the PLGR requirement could be available by September 1991. Based on the results of their investigation, the acquisition team developed an acquisition strategy that called for a single production contract (base year and four option years, firm-fixed-price, requirements type), each year with flexible quantity pricing. The acquisition strategy was then coordinated with industry during the June 1991-April 1992 time-frame. Finally, the specification and acquisition were approved and a production decision was made by the Army in December 1991.

The procurement was conducted as a two-step sealed bid with sample testing. Step 1 required bidders to submit a technical proposal and bid samples in September 1992. The Government received three proposals with bid samples. One bidder was eliminated in the bid sample testing. In step 2 the two remaining vendors were invited to submit sealed bids. Contract award was made to Rockwell International, Collins Avionics and Communications Division, in March 1993.

## Product Verification and Deployment

The Army waived the requirement for a Pre-production Operational Test based on the prior successful operational testing of the Manpack, the experience with SLGR in the Persian Gulf war, and the planned bid sample test to be completed before initial purchase. An operational test was conducted on November 12, 1992, to establish the adequacy of the logistics concept and support package.

Production deliveries began in September 1993. The production contract requires the purchase of a minimum of 4,200 PLGRs and a maximum of 13,999 in the base year and 2,000 to 20,000 units in the option years. World-wide fielding is scheduled to be completed by FY97. On August 8, 1994, a ceremony at the Collins production facility attended by the Secretary of the Army marked the delivery of the 20,000<sup>th</sup> PLGR.

## SYSTEM DESCRIPTION

Characteristic	Winning Receiver	Requirement
Size	Less than 90 in <sup>3</sup>	Less than 125 in <sup>3</sup>
Weight	Less than 4 pounds	Less than 4 pounds
Power	Less than 3 watts	3 Watts
Mean time between failure	18,500 hours	18,500 hours
Battery life	10 hours	10 hours
Military-unique features	Full selective availability Full anti-spoofing	Full selective availability Full anti-spoofing
Type of operation	Hand operated	Hand operated
Position, velocity and time @ 100 meters/sec, 2G acceleration	18 meters	18 meters
Time to first fix	Less than 3 min.	Less than 5 min.
Time to subsequent fix	Less than 1 min.	Less than 1 min.
Operating temperature	-20 to +60°C	-20 to +70°C
Service life	6 year performance and reliability warranty	5 year performance and reliability
Unit Cost	\$1,300 in base and first option years \$772 in last option year	N/A

## PLGR COMMERCIAL CONTRACT MODIFICATION

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During the summer of 1995, The Space and Missile Systems Center (SMC), Air Force Materiel Command, proposed to modify a contract previously awarded to Rockwell for Precision Light Weight GPS Receivers (PLGR). The purpose of the modification was to improve the operational effectiveness with new, privately developed technology that would extend the battery life of the units many-fold. The contract change was valued at approximately \$9.6 M, assuming all remaining quantities of the contract were exercised.

Because this modification occurred after the passage of the Federal Acquisition Streamlining Act of 1994 (FASA) but before the implementing regulations were finalized, SMC Contracting requested and was granted a waiver of the requirement for Rockwell to submit certified cost or pricing data for the change. The waiver was granted based upon the following factors:

- The PLGR is a modified version of a commercial item sold or offered for sale to the general public.
- The change was minor.
- Exempting the change from the requirement to obtain cost or pricing data was consistent with the intent of FASA to reduce the acquisition paperwork burden, increase the use of commercial pricing techniques and facilitate the procurement of commercial items on commercial terms while protecting the Government's interest by market-testing price, quality and delivery.
- Price reasonableness was determined through commercial market price and value analysis.

This commercial modification was based upon Rockwell's substantial commercial business, the fact that the upgrade was developed with private funds, and the fact that Rockwell offered the Government preferred customer (not "most favored customer") pricing with the goal of providing to the Government the latest improvements in GPS technology.



This modification provides exceptional value to the DoD in the following ways:

- The original PLGR version at the old price is still available for users who do not require the low-power new technology.
- Users requiring low-power may achieve a cost payback in as little as five months.
- The projected savings-to-cost ratio is 25:1.
- The need for lithium batteries is eliminated for some users. (Commercial AA alkaline batteries are sufficient since the unit draw is so much lower.)

## KEYS TO SUCCESS

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In an article entitled "The Precision Lightweight GPS Receiver," (*Army RD&A Bulletin*, Nov.-Dec. 1993) Colonel Bruce D. Sweeny, the Army project manager, identified the following keys to success:

- The acquisition team conducted a comprehensive market analysis that identified what commercial technology would be available in the near future and made it possible to capture it. It also made it possible for those vendors who were interested to design their product with the capability to include military-unique features.
- User participation in the tradeoff process was critical to eliminating most user specifications and standards from the system performance specification.
- The performance specification baseline was not changed through solicitation, testing and production. This gave industry confidence in the project.
- Industry was treated as a full partner in the planning process. Manufacturers' concerns were listened to and acted on.

- The government structured a sensible test program that verified the performance and supportability of the PLGR but did not over test it. Results of previous manufacturer and government tests were used in the decision process.
- The acquisition team solved problems through open discussions and kept the dialogue going until the problems were solved.
- The acquisition team developed a practical schedule and kept to it. That effort required much work and occasional timely support from higher headquarters, but it was a major contribution to the success of the project.

## APPENDIX D

# CASE STUDY 2: THE P100 PORTABLE FIREFIGHTING PUMP

### BACKGROUND

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This case demonstrates a transition from an R&D acquisition program to an NDI acquisition after technical requirements were reassessed.

Since the 1960's the gasoline-fueled P-250 portable firefighting pump has been the ubiquitous backup firefighting pump, present on all ships. In recent years concern had been expressed over the serious safety hazard caused by the need to stow the P-250's five-gallon gasoline cans on the weather and damage control deck passageways where they could contribute to the spread of fire.

The Navy's initial response was to modify the P-250 to run on the Navy's high flash jet fuel, which has additives to minimize surface vaporization and is thus significantly harder to ignite than gasoline. To get the high flash jet fuel to work in an engine designed for gasoline, the air-fuel mixture had to be spark ignited, like a gasoline-fueled engine, and it had to be started with propane. The engine was fairly hard to start and emptied an expensive propane cylinder each time the pump was used. In addition, there were fundamental problems with the basic design. It had a relatively small, high-power engine that needed water cooling. The narrow, twisting cooling-water passages were constantly being plugged by salt deposits that formed as the cooling water evaporated between uses. The salt deposits blocked cooling water flow, causing overheating and many visits to the ship's repair activity.

The Navy had recognized these problems and had initiated a program to develop a small, powerful engine that would run on high flash jet or diesel fuel and did not rely on seawater cooling. At early program reviews, it became apparent that the time and cost to develop the engine significantly exceeded expectations and an NDI solution was sought.

## THE ACQUISITION PROCESS

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The standard NDI approach was used, which included a market analysis, informal operational test and evaluation, reassessment of requirements, and procurement.

The market conditions were determined with a market survey. The survey revealed that it would not be possible to match or even come close to the performance of the P-250 with a commercially available diesel engine light enough to be portable. However, the commercially available units generally had a long commercial history, were easy to start and maintain, and were reliable.

The Navy had to be convinced that the commercially available pumps, which were far less capable than the P-250, would be useful in attacking shipboard fires. An initial series of tests, witnessed by representatives from the Navy Staff, the requiring activity, and the user, demonstrated adequate firefighting performance. However, the tests also indicated that the performance was the minimum acceptable for a shipboard firefighting pump. Other positive results of the test were that the engines were easy to start (a characteristic highly desired by the fleet), and that the units were reliable and robust.

The second phase of test and evaluation, a shipboard and land-based assessment of 25 representative commercially available pump units, showed that the units were highly suitable for shipboard use with one exception—corrosion resistance. This issue received flag level attention and was resolved by a decision to require minor modifications to the commercial products to achieve acceptable corrosion resistance.

## SOURCE SELECTION

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A team approach was used to develop the source selection plan and associated documents. The team included technical, legal, and contracting personnel from the requiring and contracting activities. The early involvement of personnel with expertise and experience in all aspects of acquisition had two positive effects. Potential problem areas were ironed out and documentation and plans were structured to minimize the impact of the unpredictable situations that inevitably turn up during procurement.

The technical requirements were documented in a performance-type purchase description. It specified size and weight limits (to ensure portability), the use of fuels and lubrication oils already present in the Navy logistic support system, and, of course, the hose interfaces. Other technical documentation included a training plan, since operation and maintenance courses would have to be developed, and a maintenance plan, so that support would be available when the pumps were outfitted. The use of military specifications was limited to the fuel and lubrication oil requirements mentioned above.

The market survey had identified a number of available pumps with a range of performance characteristics. The team determined that to get the best combination of characteristics for the least cost, the best value approach should be used. The acquisition required the formulation of a comprehensive (60 pages) source selection plan and acquisition plan (14 pages). The source selection was structured to evaluate and rate improvements beyond the minimum requirements contained in the purchase description. Proposals that did not meet the minimum requirements were considered to be not technically acceptable. The evaluation areas included, in order of priority, corrosion resistance, performance, design, supportability, and quality management.

The proposals were required to include the following:

- A bid sample.

- A description of the corrosion protection system, with a list of the materials and coatings.
- The results of a performance demonstration test, performed by the manufacturer at a nationally recognized testing laboratory and certified by the laboratory. Since there is no formal government program to certify laboratories, the laboratories proposed by the offerors were submitted to the Navy for approval by the program manager prior to testing.
- A proposed quality plan. The plans were required to detail the manufacturer's quality tests, inspections, sampling plans, and acceptance criteria as well as to describe the overall quality program. A minimum lot acceptance test and inspection was specified.

The proposals were evaluated using a best-value approach. The contract was awarded on May 4, 1995. The process required about two years from initiation of the NDI program to contract award. The contract is a fixed price, indefinite quantity contract for one year with four option years. Minimum and maximum pump deliveries are specified for each year.

## SYSTEM DESCRIPTION

<i>Characteristic</i>	<i>Requirement</i>	<i>Winning Pump</i>
<b>Weight</b>	165 pounds	164 pounds.
<b>Size</b>	24"x28"x27"	21"x23.5"x24.4"
<b>Operation Time</b>	2 hours	2.75 hours
<b>Exhaust hose weight</b>	35 pounds	17 pounds
<b>Exhaust hose diameter</b>	6 inches	4.5 inches
<b>Pump performance @ 20' lift</b>	60 gpm @ 45psi	224 gpm @ 26 psi 175 gpm @ 58 psi 100 gpm @ 83 psi
<b>Pump performance @ 35' lift</b>	60 gpm @ 45 psi	71 gpm @ 62 psi
<b>Suction lift</b>	35 feet	44 feet
<b>Time to prime</b>	120 seconds	62 seconds

#### APPENDIX D: THE P100 PORTABLE FIREFIGHTING PUMP

The following points summarize the lessons learned from this program:

- A well-written performance specification will limit the evaluation to offerors proposing units within a technical envelope that will ensure suitability. Sound technical knowledge of the product and shipboard procedures and conditions are essential to developing and defending technical requirements.
- A well-thought-out source selection plan is essential to ensure an award to a qualified manufacturer. The way to prepare an effective source selection plan is to develop sound technical knowledge of the required product and intensive knowledge of the market, including industrial manufacturing and quality standards and practices.
- An effective review of the proposals, a complete evaluation of bid samples, and thorough documentation of the details of the proposal evaluation speeds the source selection process.
- Knowledge of the acquisition requirements of the FAR by all team members contributes to successful program planning and documentation. Adherence to, and appropriate tailoring of, DoD 5000.2-R requirements ensures thorough acquisition planning.
- Early and constant involvement of the customer, the Fleet, results in improved focus, the setting of realistic priorities, inclusion of all features necessary for a suitable product, and thorough planning for fleet introduction.
- Teamwork and positive communication among all team members are essential to ensure rapid and objective responses to procurement situations and to maintain morale during the process.

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